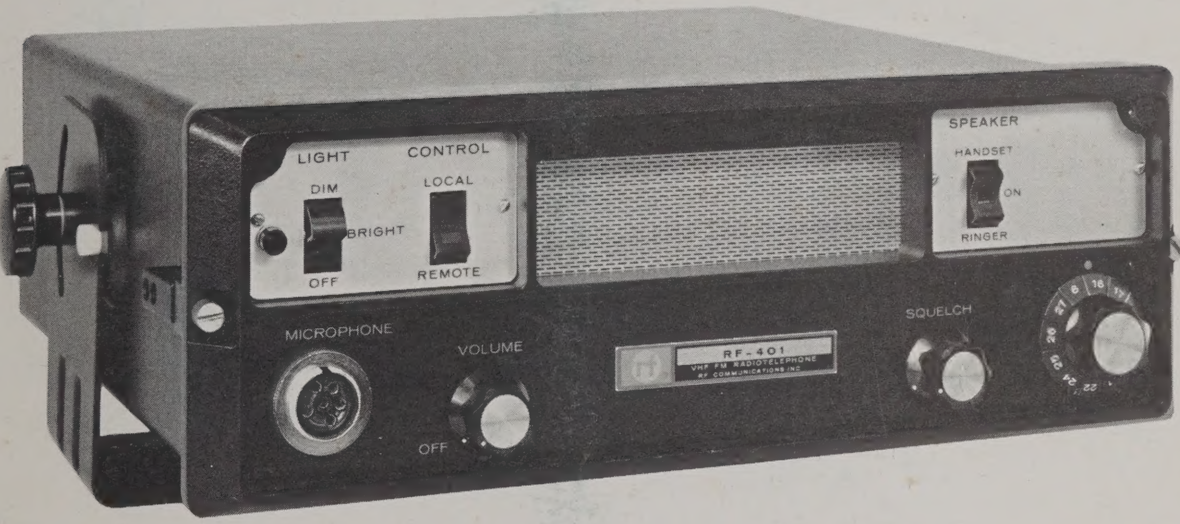
INSTRUCTION MANUAL

IM-1000



VHF FM TRANSCEIVER MODELS RF-401-2, RF-403-2, RF-404-3

RF COMMUNICATIONS, INC. ■ ROCHESTER, NEW YORK, U.S.A.

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SPECIFICATIONS

	Fixed RF-403-2	Mobile RF-403-2	Marine RF-401-2	Aircraft RF-404-3
PHYSICAL				
Size - 4-3/4" h (12cm) x 13" w (33cm) x 13-3/4" d (35cm)	X	X	X	X
Weight	20 lbs (9. 1 kg)	21 lbs (9. 53 kg)	21 lbs (9. 53 kg)	22. 5 lbs (10. 3 kg)
Mounting Position - any	X	X	X	X
Cooling - Conduction/Radiation	X	X	X	X
Housing - Vinyl painted cabinet. Drip-proof, dust-tight construction.	X	X	X	X
Cable Entry - rear	X	X	X	X
ELECTRICAL				
Number of Channels	2	4	12	12
Frequency Range (MHz)	132 to 174	132 to 174	132 to 174	138 to 143
Operating Temperature Range	-30°C (-22°F) to +60°C (+140°F)			
Elevation (Ft. above Mean Sea Level)	0 to 15,000			0 to 45,000
Humidity	0 to 95% at +50°C (+122°F)			
T/R Changeover Time (seconds)	0. 7	0. 7	0. 7	0. 7
Channel Change Time	Instantaneous			
Frequency Stability (parts per million)	10	10	10	10
Frequency Spread	2 MHz at 141 MHz			

SPECIFICATIONS (Cont)

	Fixed RF-403-2	Mobile RF-403-2	Marine RF-401-2	Aircraft RF-404-3
ELECTRICAL (Cont.)				
Antenna Impedance (ohms)	50	50	50	50
Emission	16F3	16F3	16F3	16F3
Control	Local	Local	Local	Remote
Primary Voltage (vdc) positive or negative ground	13. 6± 20%	13. 6± 20%	13. 6± 20%	27. 5± 2 vdc
Current Drain - Monitor (amps)	0. 1	0. 1	0. 1	0. 1
Transmit (amps)	17. 0	17. 0	17. 0	5. 0
TRANSMITTER				
Type of Service	Intermittant (EIA)			
Power Output (watts)	80	80	80	25
Deviation	±5 kHz for 100% modulation at 1 kHz			
Spurious Attenuation - Conducted	-80dB	-80dB	-80dB	-80dB
Radiated	-60dB	-60dB	-60dB	-60dB
FM Hum and Noise	-40dB	-40dB	-40dB	-40dB
AM Hum and Noise	-34dB	-34dB	-34dB	-34dB
Maximum Distortion	10% at 1 kHz			
Audio Response	Within +1 and -3dB of a true 6 dB per octave pre-emphasis characteristic from 300 to 3000 Hz; roll-off to -50 dB at 20 kHz.			
Modulation Limiting	5 kHz	5 kHz	5 kHz	5 kHz
Occupied Bandwidth	20 kHz	20 kHz	20 kHz	20 kHz

SPECIFICATIONS (Cont)

	Fixed RF-403-2	Mobile RF-403-2	Marine RF-401-2	Aircraft RF-404-3
RECEIVER				
Type of Service	Continuous			
Useable Sensitivity	0. 4 uV for 12 dB SINAD			
Quieting Sensitivity	0. 50 uV for 20 dB			
Squelch Sensitivity	0. 35uV	0. 35uV	0. 35uV	0. 35uV
Adjacent Channel Selectivity	-75dB	-75dB	-75dB	-75dB
Spurious Response Attenuation	-85dB	-85dB	-85dB	-85dB
Intermodulation Spurious Attenuation	-65dB from useable sensitivity			
Image Response	-70dB	-70dB	-70dB	-70dB
Hum and Noise - Unsquelched Squelched	40dB 50dB	40dB 50dB	40dB 50dB	40dB 50dB
Audio Output Power	4 watts with less than 10% distortion			
Audio Response	Within +2 to -8dB of a true 6dB per octave de-emphasis characteristic from 300 to 3000 Hz.			

CHAPTER 1

INSTALLATION

1.1 INSTALLATION PLANNING

1.1.1 Marine Installations

The location in which the transceiver is installed should allow easy access to the front panel controls as well as providing for good air circulation around the transceiver to obtain maximum cooling. Also allow sufficient clearance at the rear of the transceiver to provide easy access to the fuses and cable connectors. As with all marine installations, some protection should be provided to protect the transceiver from rain and heavy seas.

The transceiver should be located as close as possible to the primary power source and antenna in order to keep the power and antenna cables as short as possible. These cables should also be as far as practical from any noise sources. Also keep in mind that some navigation instruments, such as magnetic compasses and radio direction finders can be affected by rf radiation. Therefore, the transceiver and associated cables should not be installed adjacent to these instruments.

1.1.2 Aircraft Installations

As the transceiver in this installation is to be remotely controlled, the location in which the transceiver is installed need not provide easy access to the front panel controls. However, sufficient room should be provided at the rear panel for access to the fuses and connectors as well as providing for good air circulation to obtain maximum cooling. As some equipment, such as marker beacons and ILS receivers, could be affected by rf radiation, the transceiver should not be installed adjacent to these receivers.

In order to minimize power and signal losses, the transceiver should be located as close as possible to the antenna and primary power source. These cables should also be kept as far as practical from any noise sources.

Refer to instruction manual IM-0201 for installation planning and installation instructions for the RF-423 Remote Control.

1.1.3 Mobile Installations

In a mobile installation, the transceiver should be located to provide easy access to the front panel controls and rear panel connectors and fuses. The location should also allow for good air circulation to obtain maximum cooling. The transceiver should not be located in such a position as to interfere with the normal operation of the vehicle.

In order to minimize power and signal loss, the transceiver should be located as close as possible to the power source and antenna. The power and antenna cables should also be kept as far as practical from any sources of noise.

1.1.4 Fixed Installations

As in the other types of installations, the transceiver should be located so as to provide easy access to the front panel controls and rear panel connectors and fuses. The location should also allow good air circulation to obtain maximum cooling.

The transceiver should be located as close as possible to the power source and antenna to keep the power and antenna cables as short as possible to minimize line losses. These cables should also be kept away from any sources of noise.

1.2 INSTALLATION PROCEDURES

1.2.1 Transceiver Installation With Hanger Bracket

a) Referring to figure 1.1(B), mark and drill the four mounting holes. (Use a #20 twist drill.)

b) Referring to figure 1.2, place the hanger bracket over the holes, with the slots facing forward.

Note

Whether the hanger bracket is located above or below the transceiver, the slots must face forward.

c) Secure hanger bracket to mounting surface using the four #12 x 3/4" long self-tapping screws supplied.

d) Referring to figure 1.2, secure the two 3/8" x 1/4" nylon spacers to the case using the two 8-32 x 1/4" long pan head screws.

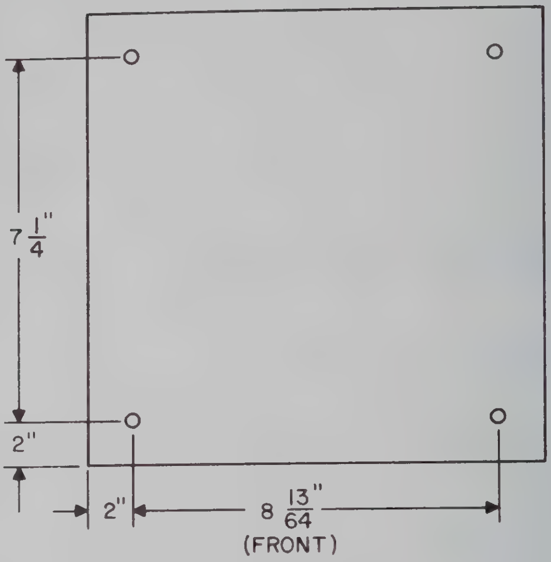
e) Carefully slide case into hanger bracket so that nylon spacers are in hanger bracket slots.

Note

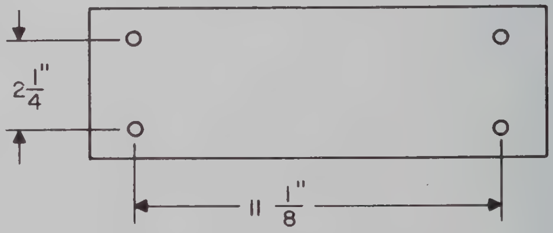
If severe vibration conditions are encountered or expected, mount the transceiver in the hanger bracket using the slots closest to the bottom of the hanger bracket.

f) Insert knobs into case through curved slots in hanger bracket and tighten.

g) Refer to paragraph 1.3 for electrical connection procedures.



(A) CASE MOUNTING HOLE DIMENSIONS



(B) HANGER BRACKET MOUNTING HOLE DIMENSIONS

FIGURE 1.1 - TRANSCEIVER MOUNTING HOLE DIMENSIONS

1.2.2 Transceiver Installation Without Hanger Bracket

a) Referring to figure 1.1(A), mark and drill the four mounting holes. (Use a #20 twist drill.)

b) Remove the four rubber feet from the bottom of the case.

c) Place the case over the four mounting holes.

d) Secure the case to the mounting surface using the four #12 x 3/4" long self-tapping screws supplied.

e) Refer to paragraph 1.3 for electrical connection procedures.

1.2.3 Handset and Hanger Installation

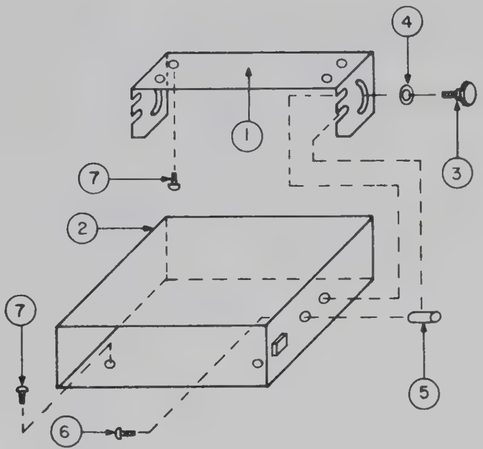
To install the handset and hanger, refer to figure 1.3.

1.2.4 Extension Speaker Installation

To install the extension speaker, refer to figure 1.4.

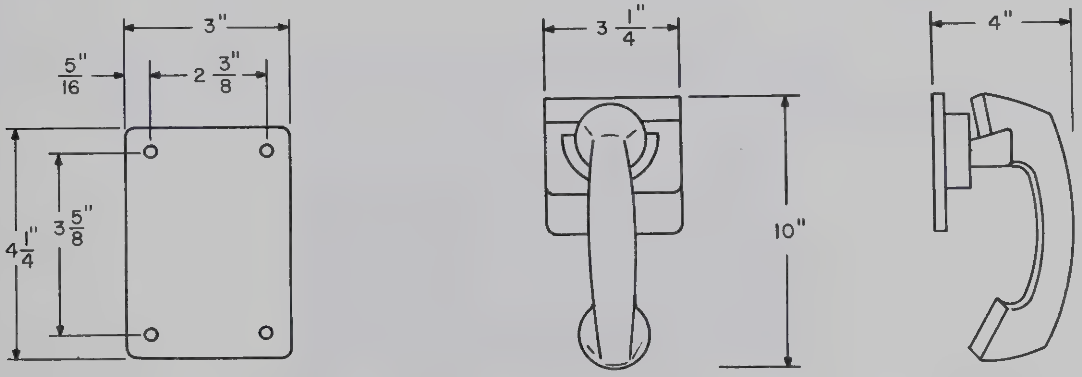
CAUTION

Remove jumper wire connected between terminals 5 and 6 on TB2 when extension speaker is connected to transceiver. If extension speaker is disconnected, be sure to reconnect the jumper wire.



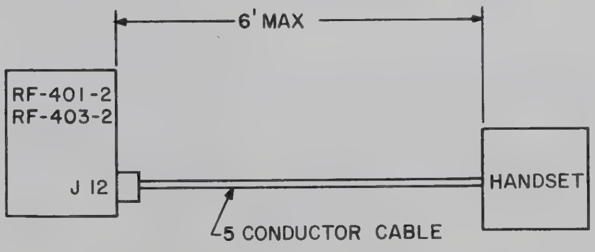
① HANGER BRACKET
② CASE
③ KNOB (2)
④ NYLON WASHER (2)
⑤ NYLON SPACER, 3/8" X 1/4" LG (2)
⑥ PAN HEAD SCREW, 8-32 X 1/4" LG (2)
⑦ SELF-TAPPING SCREW, #12 X 3/4" LG (4)

FIGURE 1.2 - MECHANICAL ASSEMBLY AND INSTALLATION DIAGRAM



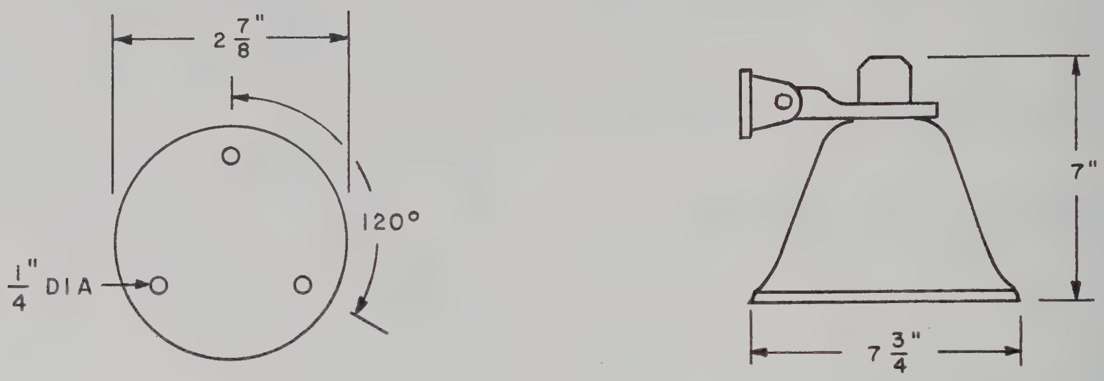
(A) MOUNTING HOLE DIMENSIONS

(B) OVERALL DIMENSIONS

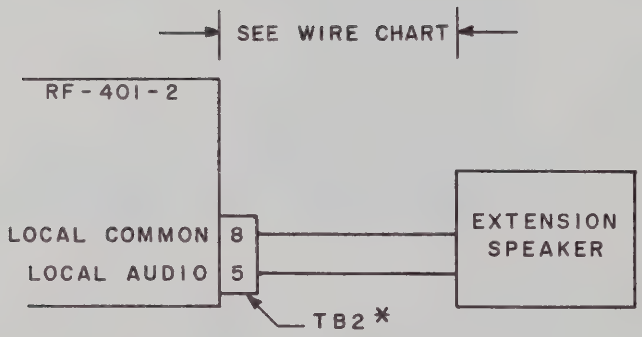


(C) ELECTRICAL CONNECTION

FIGURE 1.3 - HANDSET AND HANGER INSTALLATION DIAGRAM



(A) MOUNTING DIMENSIONS

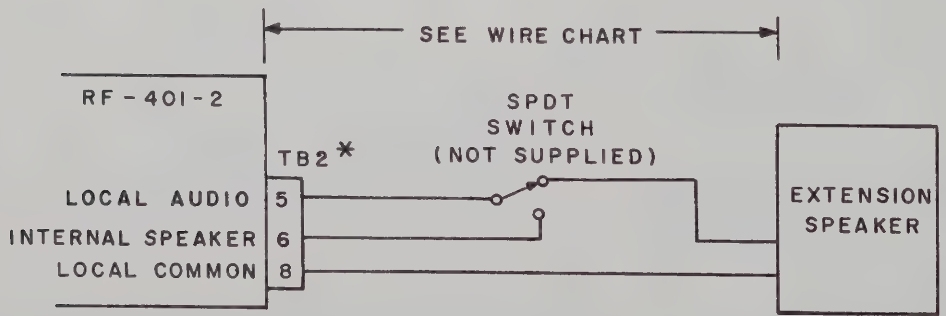


* REMOVE JUMPER WIRE CONNECTED BETWEEN TERMINALS 5 AND 6 ON TB2 ON RF-401 REAR PANEL

WIRE CHART

WIRE SIZE (AWG)	LENGTH OF RUN (FT)
18	UP TO 35
16	35 TO 55
14	55 TO 90
12	OVER 90

(B) STANDARD ELECTRICAL CONNECTION DIAGRAM



* SEE ABOVE

(C) OPTIONAL ELECTRICAL CONNECTION DIAGRAM

FIGURE 1.4 - EXTENSION SPEAKER INSTALLATION DIAGRAM

1.3 TRANSCEIVER ELECTRICAL CONNECTIONS

The transceiver is designed to be operated from either a positive or negative ground dc primary power source. It is important that the positive side of the primary power source is connected to the + (plus) terminal of TB1 and that the negative side is connected to the - (minus) terminal of the TB1 (see figure 1.5). If the primary power leads are reversed, fuse F1 will be opened when power is applied to the transceiver.

Primary power cables are supplied in the ancillary kit for use in the marine, aircraft, and mobile installations. These cables have lugs attached at one end for connection to the transceiver. For fixed installations, use a number 8 AWG cable for distances up to 20 feet from the primary power source. For distances of up to 35 feet, it is suggested that a number 6 AWG cable be used.

The shorting bar, supplied with the ancillary kit should be used to connect the primary power return line to chassis ground at the transceiver rear panel.

A fuse block and primary power fuse (see table 1.1) are supplied with the ancillary kit. This fuse block can be used if a fuse block is not already installed or if there are no extra circuits on the existing fuse block. The primary power fuse must be in series with the hot (ungrounded) line.

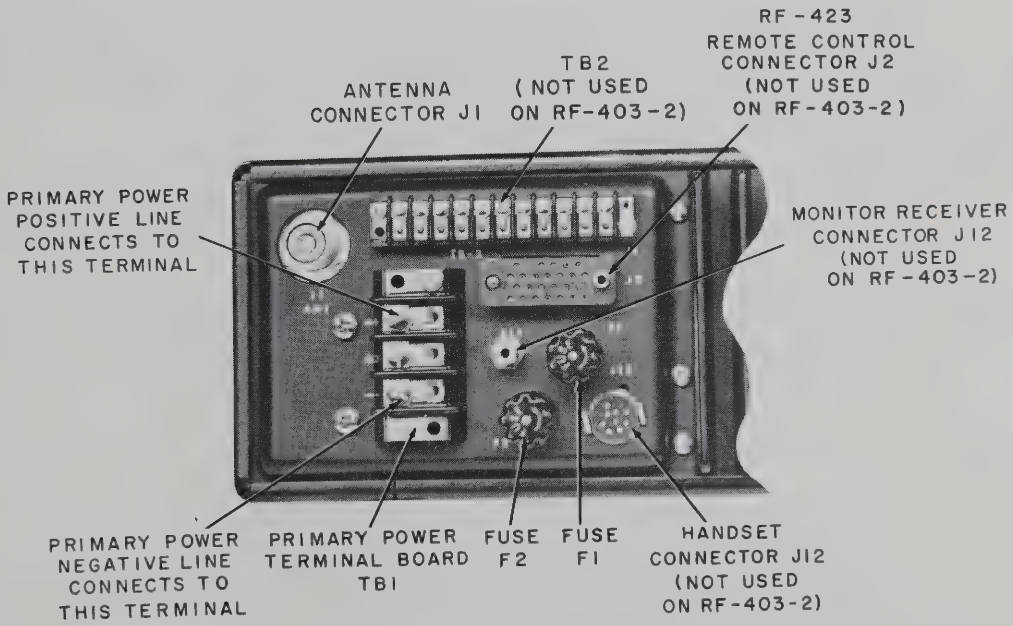

RF-423 REMOTE CONTROL CONNECTOR J2 (NOT USED ON RF-403-2)
TB2 (NOT USED ON RF-403-2)
ANTENNA CONNECTOR J1
PRIMARY POWER POSITIVE LINE CONNECTS TO THIS TERMINAL
MONITOR RECEIVER CONNECTOR J12 (NOT USED ON RF-403-2)
PRIMARY POWER NEGATIVE LINE CONNECTS TO THIS TERMINAL
PRIMARY POWER TERMINAL BOARD TB1
FUSE F2
FUSE F1
HANDSET CONNECTOR J12 (NOT USED ON RF-403-2)

FIGURE 1.5 - TRANSCEIVER REAR PANEL (PARTIAL VIEW)

TABLE 1.1 TRANSCEIVER PRIMARY POWER FUSES

TRANSCEIVER MODEL NUMBER	PRIMARY VOLTAGE	FUSE (QUICK ACTING)
RF-401-2	13.6 vdc	25 amps
RF-403-2	13.6 vdc	25 amps
RF-404-3	27.5 vdc	10 amps

1.4 INITIAL ADJUSTMENTS

After the transceiver has been installed, the following items must be checked and adjusted, as required: transmitter frequency; deviation; dc input to the power amplifier. For check and adjustment procedures, refer to table 4.14 for transmitter frequency, table 4.13 for deviation, and table 4.11 for tuning the power amplifier into the antenna.

CHAPTER 2

OPERATION

2.1 OPERATING INSTRUCTIONS

The following operating instructions pertain to marine, mobile and fixed installations. For aircraft installations, refer to instruction Manual IM-0201 to operate the transceiver from the RF-423 Remote Control.

Note

> Step a applies to marine transceivers only. The remaining steps apply to all transceivers except aircraft.

a) On marine transceiver, set CONTROL switch at LOCAL, SPEAKER switch at ON and LIGHT switch at desired illumination level.

b) Rotate VOLUME control out of OFF (detent) position to apply power to transceiver and set at desired listening level.

c) Set SQUELCH control at desired squelch level. Maximum counterclockwise position provides maximum squelch.

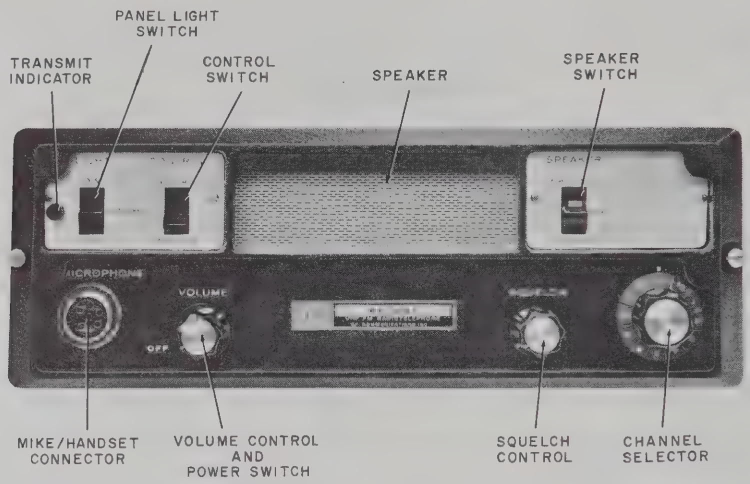
d) Set channel selector switch at desired channel.

e) To transmit, depress push-to-talk switch and speak into microphone. Observe that red transmit indicator, on transceiver front panel, illuminates when push-to-talk switch is depressed. At end of transmission, release the push-to-talk switch. Received audio signals will be applied to either the transceiver front panel speaker or handset earpiece.

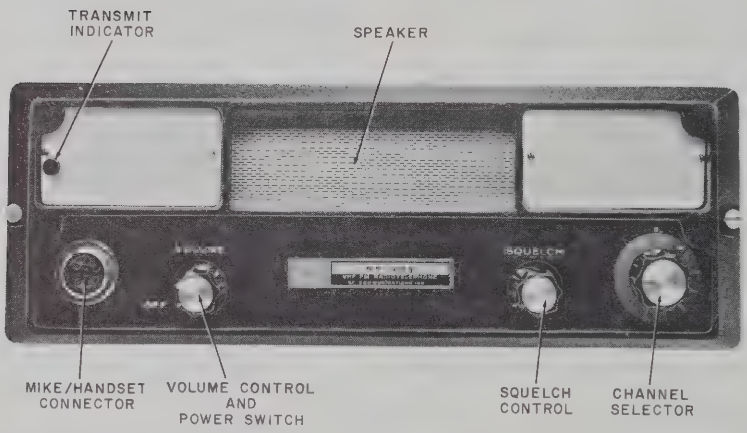
Note

> When handset is placed in the hanger, received audio signals will be applied to the transceiver front panel speaker.

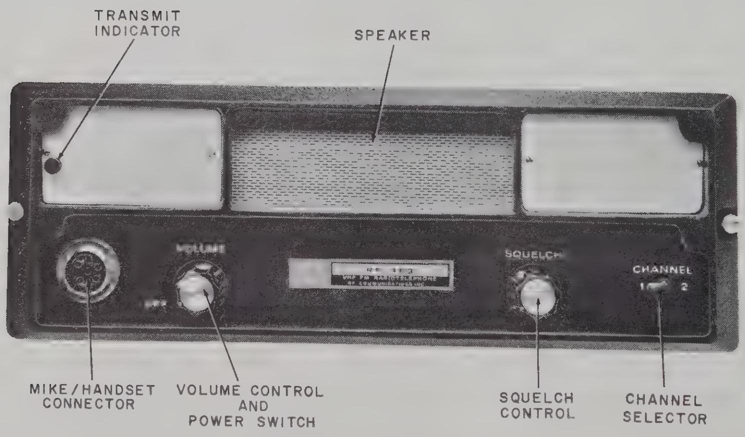
f) To turn off the transceiver, rotate the VOLUME control fully counterclockwise into the OFF (detent) position.



(A) RF-401-2 AND RF-404-3



(B) RF-403-2 (4-CHANNEL)



(C) RF-403-2 (2-CHANNEL)

FIGURE 2.1 - TRANSCEIVER OPERATING CONTROLS AND INDICATORS

TABLE 2.1 - OPERATING CONTROLS, INDICATORS AND CONNECTORS

CONTROL, INDICATOR OR CONNECTOR	FUNCTION
VOLUME control	Applies primary power when rotated out of detent position and controls audio signal level applied to front panel speaker, external speaker or handset.
SQUELCH control	Controls squelch sensitivity.
LIGHT switch (RF-401-2 and RF-404-3 only)	Three-position rocker switch. DIM - Provides low-level front panel illumination. BRIGHT - Provides high-level front panel illumination. OFF - Front panel is not illuminated. Provides minimum power drain when monitoring.
CONTROL switch (RF-401-2 and RF-404-3 only)	Two-position rocker switch. LOCAL - Operation is from receiver front panel. REMOTE - Operation is from RF-423 Remote Control.
SPEAKER switch (RF-401-2 and RF-404-3 only)	Three-position rocker switch. HANDSET - Front panel speaker is disabled for conversation privacy when handset is removed from hanger. ON - Receive audio signals are applied to front panel speaker even when handset is removed from hanger. RINGER - Front panel speaker is disabled and audio is applied to selective ringer (not supplied).
Channel Selector	Selects desired channel.
MICROPHONE connector	Used for connecting microphone or handset to the transceiver.
Transmit indicator	Illuminates when transmitter is keyed.

CHAPTER 3

PRINCIPLES OF OPERATION

3.1 GENERAL

The transceiver employs a phase-modulated FM transmitter and dual-conversion superheterodyne receiver on a common chassis. Depending upon the particular transceiver (see specifications) operation is on any one of up to twelve crystal-controlled channels in the frequency range of 132 to 174 MHz.

With the exception of the power amplifier, all circuitry utilizes solid-state components. The power amplifier uses a type 8509 instant-heating vacuum tube. A self-contained power supply provides the necessary operating voltages. Depending upon the power supply, the transceiver can operate from one of two primary voltage sources: 13.6 or 27.5 vdc.

3.2 RECEIVE CIRCUITS

The receiver portion consists of receiver assembly A1, part of oscillator assembly A3, multiplier assembly A7 and associated circuitry.

The rf signals from the antenna are applied through the antenna low-pass filter and a pair of de-energized contacts of T/R relay K1 to receiver assembly A1 (figures 3.1 and 4.9 through 4.11).

Receiver assembly A1 (paragraph 3.4) contains the necessary circuitry to extract the audio information from the received rf signal. Two stages of audio amplification are used to raise the audio signal to a level suitable for driving the front panel speaker, extension speaker or handset earpiece.

The receive injection frequency oscillator, located on oscillator assembly A3 (paragraph 3.6) supplies a crystal-controlled injection frequency to receiver assembly A1 through multiplier assembly A7. The receive injection frequency oscillator is controlled by ground, applied through Channel Selector switch S4, and by +10 vdc, developed on receiver assembly A1, applied through a pair of de-energized contacts of T/R relay K1.

3.3 TRANSMIT CIRCUITS

The transmitter portion consists of exciter assembly A2, PA assembly A4, part of oscillator assembly A3 and associated circuitry. Audio signals from the microphone or handset are applied from front panel connector J3 to the input of exciter assembly A2 (figures 3.1 and 4.9 through 4.11). Exciter assembly A2 (paragraph 3.5) contains the necessary circuits for converting the audio signals into a phase-modulated rf signal. The rf output of exciter assembly A2 is amplified by PA assembly A4, the output of which is applied through a pair of energized contacts on T/R relay K1 and the antenna low-pass filter to the antenna.

Transmit/receive relay K1 is controlled by the microphone or handset push-to-talk switch and is energized in the transmit mode.

The antenna low-pass filter is used for harmonic suppression and attenuates signals above 190 MHz.

3.4 RECEIVER ASSEMBLY A1

The received rf signals applied to receiver assembly A1 are amplified by two stages of rf amplification (Q1 and Q2) and applied to first mixer Q3 (figures 3.2 and 4.12).

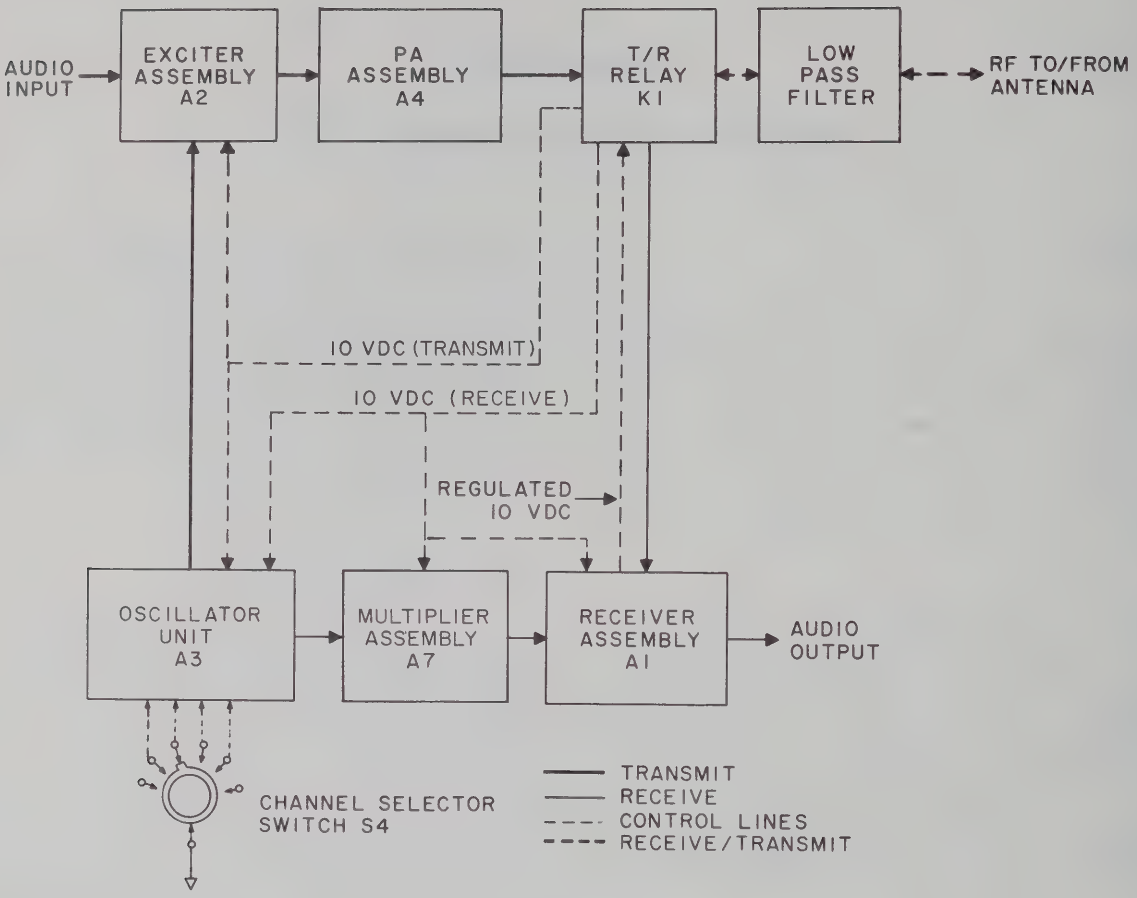


FIGURE 3.1 - TRANSCEIVER BLOCK DIAGRAM

The amplified rf signal applied to first mixer Q3 is mixed with an injection frequency supplied by oscillator assembly A3 (paragraph 3.6) through multiplier assembly A7 (paragraph 3.8).

First mixer Q3 mixes the amplified rf signal, 141 MHz nominal, and the injection frequency, 121 MHz nominal. The difference frequency output of first mixer Q3, 20 MHz, is applied to second mixer Q10 through 20 MHz crystal filter FL1 and two stages of rf amplification (Q7 and Q8).

The 20 MHz signal applied to second mixer Q10 is mixed with a second injection frequency, 20.455 MHz, generated by crystal oscillator Q9. The difference frequency output of second mixer Q10, 455 kHz, is applied to IC1, an integrated circuit.

Integrated circuit IC1, performs the function of a two-stage 455 kHz IF amplifier with a single stage of limiting at the output.

The 455 kHz IF output of IC1 is applied to a Foster-Seeley type discriminator that detects the audio intelligence contained in the 455 kHz IF. The audio intelligence is applied to buffer amplifier Q11, the output of which is applied to the first stage of audio amplification and the noise squelch circuit.

Buffer amplifier Q11 isolates the discriminator stage from the following stages, thus preventing the discriminator from being overloaded.

There are two stages of audio amplification. The first stage of audio amplification, IC2, is

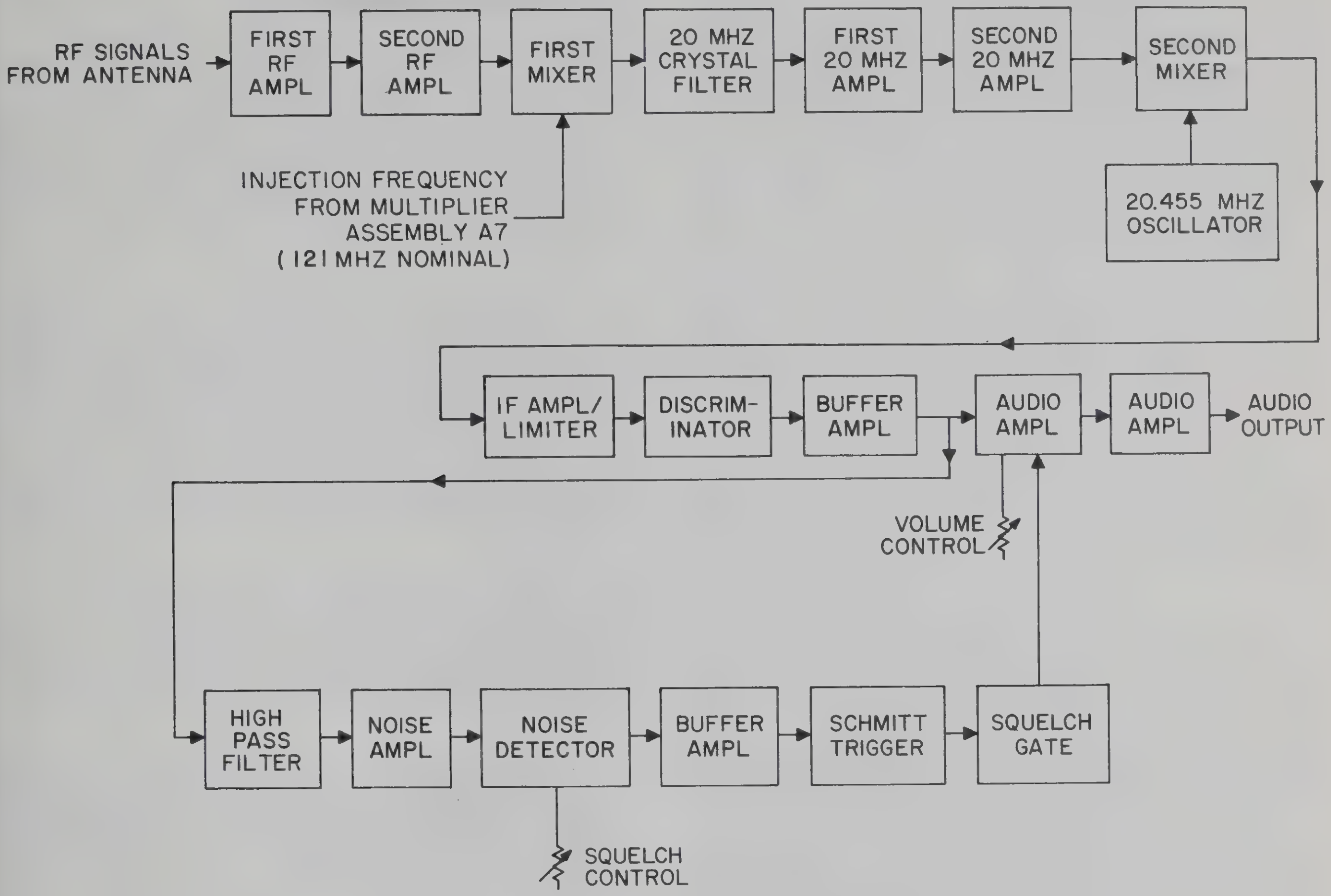


FIGURE 3.2 - RECEIVER ASSEMBLY A1, BLOCK DIAGRAM

an integrated circuit that performs three functions: 1) pre-amplification, 2) variable audio gain, and 3) signal gating. Variable audio gain is obtained by applying an adjustable dc voltage from the wiper of VOLUME control R3 to IC2. The gating effect is obtained by completion of a dc path to common through squelch gate Q6. The output of IC2 is applied to the second stage of audio amplification.

The second stage of audio amplification is a complimentary symmetry amplifier, Q22 through Q27, enabled by application of either 12 or 24 volts dc through a pair of de-energized contacts of T/R relay K1 (figures 4.9 through 4.11) during receive. This circuit is capable of delivering 4 watts of audio power, through coupling capacitor C13, to the front panel speaker or extension speaker and 80 mw to the handset earpiece.

The squelch circuit is formed by a high-pass filter, noise amplifier Q15, noise detector CR5, CR6, buffer amplifier Q16, Schmitt Trigger Q17, Q18 and squelch gate Q6. It operates by detecting the effect the carrier has on the noise output of the discriminator.

In the absence of a carrier signal, maximum audio noise is present (300 Hz to approximately 10 kHz). This noise level is reduced when a carrier signal of the correct frequency is present at the antenna terminal. The squelch circuit detects this variation of noise level and causes the audio output to be gated through to the speaker, etc. In the absence of a carrier signal, the receiver is returned to the muted state. The sensitivity of the squelch circuit to the rf input signal is determined by the setting of SQUELCH control R4.

In the absence of a carrier signal, the noise output of buffer amplifier Q11 is applied to the high pass filter formed by capacitors C70, C71, C74 and inductor L21. This filter attenuates any voice signals (300 Hz to 3 kHz) allowing only the high frequency noise to be applied to the squelch circuit. The filter output is amplified by Q15 and detected by the noise detector, CR5, CR6. The resultant negative going output is applied to the Schmitt Trigger, Q17, Q18 through buffer amplifier Q16.

Buffer amplifier Q16 provides isolation between the noise detector and Schmitt Trigger to prevent the Schmitt Trigger from overloading the detector.

Transistors Q17 and Q18 form a Schmitt Trigger circuit. With a negative going signal applied to the base of transistor Q17, transistor Q17 will be turned off. With transistor Q17 turned off, transistor Q18 will be turned on. With the Schmitt Trigger in this condition (Q17 off, Q18 on), squelch gate Q6 will be turned off, thus disabling the first stage of audio amplification. The triggering action is rapid and positive thus preventing partial squelching action.

With a carrier signal present, there is no output from noise detector CR5, CR6. In this condition, the state of the Schmitt Trigger is reversed; transistor Q17 is turned on, and transistor Q18 is turned off. With transistor Q18 turned off, squelch gate Q6 is turned on, thus enabling the first stage of audio amplification.

The +10 vdc regulator, formed by transistors Q19, Q20 and Q21, supplies a regulated +10 vdc used on receiver assembly A1, exciter assembly A2, oscillator assembly A3, and multiplier assembly A7. The regulated +10 vdc is applied to receiver assembly A1, oscillator assembly A3 and multiplier assembly A7 (in the receive mode) through a pair of contacts on T/R relay K1.

3.5 EXCITER ASSEMBLY A2

Audio signals from either the microphone or handset are applied to mike amplifier Q1, the output of which is applied to the speech clipper stage formed by diodes CR2 and CR3 (figures 3.3 and 4.13).

The speech clipper stage provides a symmetrical clipping of the applied audio signal. This clipping action increases the average power of the modulating signal. The output signal is applied to the active low-pass filter network formed by emitter follower Q2 and associated circuitry.

The filter provides post-limiter roll-off. The filter output is applied to amplifier Q3, the output of which is applied to the phase modulator.

Deviation Adjust control, R16, in the collector circuit of Q3 is used to adjust the transmitter deviation by controlling the level of the audio drive signal applied to the modulator.

The phase modulator consists of varactors CR4, CR5 and tuned inductors L1, L2. The applied audio drive signal varies the capacitance of the varactors that phase modulates the 11.75 MHz (nominal) injection frequency. The injection frequency is generated by the transmit oscillator located on oscillator assembly A3 (paragraph 3.6). The phase modulator output, essentially an FM signal with a pre-emphasis characteristic, is applied to three class C amplifiers, used as multipliers; one tripler and two doublers.

Tripler Q4 produces a 35.25 MHz nominal output that is applied to doubler Q5 through a tuned tank formed by inductors L3, L4. These inductors are tuned to three times the crystal frequency.

Doubler Q5 produces an output of 70.50 MHz (nominal) that is applied to a second doubler

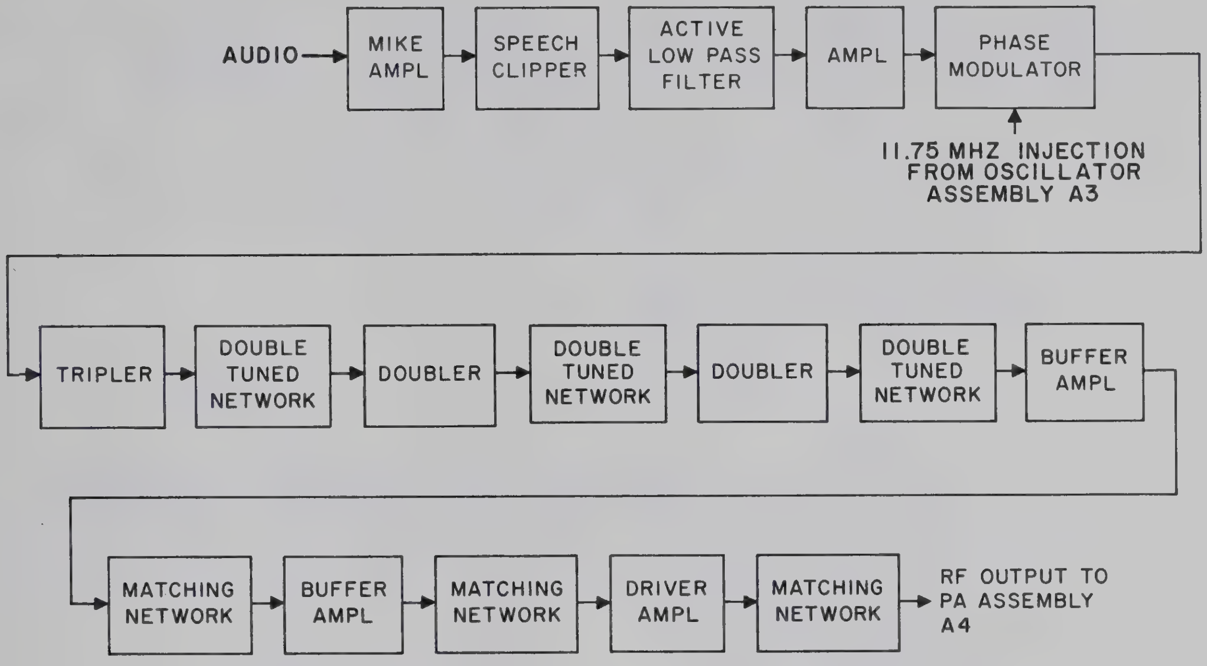


FIGURE 3.3 - EXCITER ASSEMBLY A2, BLOCK DIAGRAM

Q6, through another tuned tank formed by inductors L5, L6. These inductors are tuned to six times the crystal frequency.

Doubler Q6 produces an output of 141 MHz (nominal) that is successively amplified by amplifiers Q7, Q8 and driver amplifier Q9. The output of doubler Q6 is applied to amplifier Q7 through a tuned tank formed by inductors L7, L8 that are tuned to 12 times the crystal frequency. The output of driver amplifier Q9 is coupled to power amplifier assembly A4.

3.6 OSCILLATOR ASSEMBLY A3

Oscillator assembly A3 contains the necessary circuits for generating the crystal-controlled receive and transmit injection frequencies. Depending upon the particular transceiver, up to three oscillator assemblies are used, with each assembly providing four channels with the exception of the fixed-installation transceiver that uses a two-channel oscillator assembly. The oscillator assembly contains two oscillators, two buffer amplifiers, and one receive and one transmit crystal for each active channel.

In the receive mode, regulated 10 vdc (from receiver assembly A1) is applied to oscillator Q1 and amplifier Q2 (figures 3.4 and 4.14), through a pair of contacts on T/R relay K1. Ground is applied through Channel Selector switch S4 to one side of a diode gate located in the base circuit of oscillator Q1. With ground applied, the diode gate is forward biased, thus connecting its associated crystal into the base circuit of oscillator Q1. The oscillator output is amplified by Q2, the output of which is applied to multiplier assembly A7. Amplifier Q2 also acts as a buffer to prevent the multiplier circuits on multiplier assembly A7 from loading the oscillator.

In the transmit mode, the regulated 10 vdc is switched by T/R relay K1 to oscillator Q3 and amplifier Q4. Oscillator Q3 is enabled, in the transmit mode, in the same manner as oscillator Q1 is enabled in the receive mode. The output of amplifier Q4 is applied to the phase modulator on exciter assembly A2.

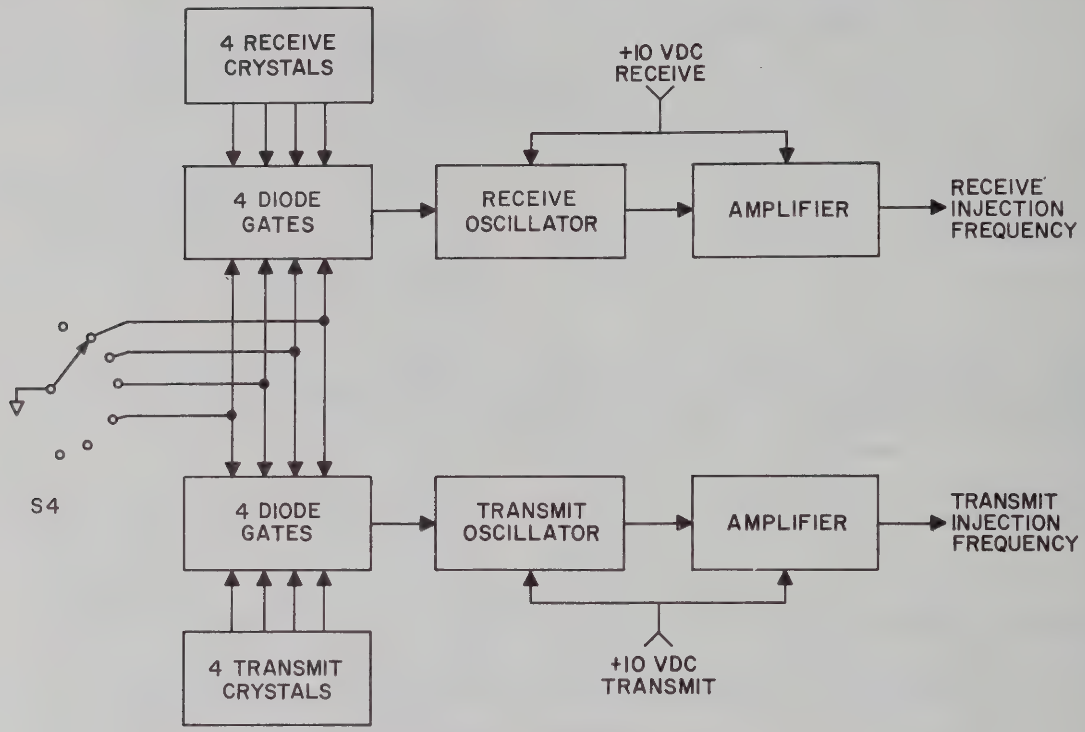


FIGURE 3.4 - OSCILLATOR ASSEMBLY A3, BLOCK DIAGRAM

3.7 POWER AMPLIFIER ASSEMBLY A4

Power amplifier V1 is a class C push-pull amplifier with link coupling in both input and output circuits (figure 4.15). Grid bias is applied to the center tap of the input link secondary winding. Plate voltage is applied to the center tap of the output link primary winding. Variable capacitor A4A1C5 (PA GRID TUNE) connected across the input link secondary winding (located on PA grid board A4A1) is used to tune the grid circuit. Variable capacitor A4A2C1 (PA PLATE TUNE) connected across the output link primary winding (located on capacitor/coil board A4A2) is used to tune the plate circuit. Variable capacitor C5 (ANTENNA LOAD) in series with the output link secondary winding is used to load the antenna circuit.

From the output link secondary winding, the amplified rf signal is applied to the antenna through transmit/receive relay K1 and the antenna low-pass filter.

The plate and control grid voltages are applied directly to power amplifier V1 from the rectifier/filter assembly (paragraph 3.9). The screen grid voltage, also developed on the rectifier/filter assembly, is applied through TUNE/OPERATE switch S2 and T/R relay K1 to power amplifier V1 (figures 4.9 through 4.11). Filament voltage for power amplifier V1 is supplied directly from the dc/ac inverter assembly (paragraph 3.10).

3.8 MULTIPLIER ASSEMBLY A7

The injection frequency supplied by oscillator assembly A3, a nominal 15.125 MHz, is applied to two class C amplifiers used as multipliers (figures 3.5 and 4.14). First multiplier Q1 is a frequency quadrupler and produces an output of 60.5 MHz, nominal. The output of the first multiplier is applied to second multiplier Q2 through a triple-tuned network.

Second multiplier Q2 is a frequency doubler and produces an output of 121 MHz, nominal.

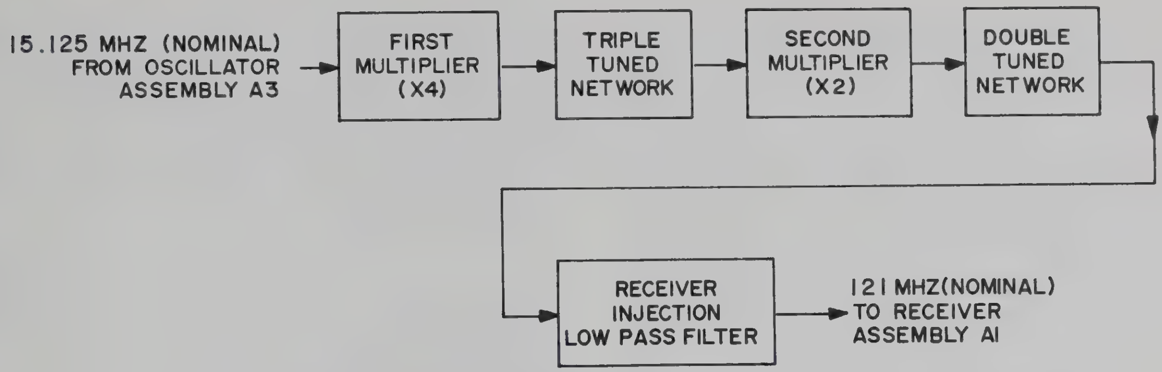

15.125 MHZ (NOMINAL) FROM OSCILLATOR ASSEMBLY A3
FIRST MULTIPLIER (X4)
TRIPLE TUNED NETWORK
SECOND MULTIPLIER (X2)
DOUBLE TUNED NETWORK
RECEIVER INJECTION LOW PASS FILTER
121 MHZ(NOMINAL) TO RECEIVER ASSEMBLY A1

FIGURE 3.5 - MULTIPLIER ASSEMBLY A7, BLOCK DIAGRAM

The output of second multiplier Q2 is applied to first mixer Q3 on receiver assembly A1 through a double-tuned network and the receiver injection low-pass filter.

3.9 RECTIFIER/FILTER ASSEMBLIES

3.9.1 RF–403–2 Rectifier/Filter Assembly A5

Used in the RF-403-2 transceiver, rectifier/filter assembly A5 (figure 4.16) contains two full-wave bridge rectifiers and one half-wave rectifier, that convert the applied ac voltages, from dc/ac inverter A8, into the required dc operating voltages.

The full-wave bridge rectifier, consisting of diodes CR1 through CR4, in conjunction with the full-wave bridge rectifier consisting of diodes CR5 through CR8, supplies the plate voltage for power amplifier A4V1. The full-wave bridge rectifier consisting of diodes CR5 through CR8 also provides the screen voltage for power amplifier A4V1 and half-wave rectifier, CR9, supplies the control grid bias.

3.9.2 RF–401–2 and RF–404–3 Rectifier/Filter Assemblies A5 and A6

Used in the RF-401-2 and RF-404-3 transceivers, rectifier/filter assemblies A5 and A6 (figure 4.17) convert the applied square-wave ac voltages, from dc/ac inverter A8, into the required dc operating voltages.

Assembly A5 contains two full-wave birdge rectifiers and one half-wave diode rectifier. The full-wave bridge rectifier, consisting of diodes CR1 through CR4, in conjunction with the full-wave bridge rectifier consisting of diodes CR5 through CR8, supplies the plate voltage for power amplifier A4V1. The full-wave bridge rectifier consisting of diodes CR5 through CR8 supplies the screen grid voltage for power amplifier A4V1. Half-wave rectifier, diode CR9, supplies the control grid bias voltage for power amplifier A4V1.

Assembly A6 contains a full-wave bridge rectifier, consisting of diodes CR1 through CR4 and a capacitive input pi-type filter, and provides +12 vdc transmit for exciter assembly A2 in the RF-404-3 transceiver.

3.10 DC/AC INVERTER A8

The dc/ac inverter, A8, used in the RF-401-2 and RF-403-2 transceivers, changes the 13.6 vdc primary voltage into a square-wave ac voltage (figure 4.19) while the dc/ac inverter used in the RF-404-3 transceiver changes the 27.5 vdc primary voltage into a square-wave ac voltage (figure 4.20). The outputs of both inverters are applied to the rectifier/filter assemblies (paragraph 3.9) and, irregardless of the primary voltage, operate in the same manner.

When primary power is applied, the two transistors will conduct (figures 4.19 and 4.20).

Due to electrical characteristics of the transistors, one transistor will conduct more heavily than the other.

As the current flow increases, a voltage is induced in the transformer (A1T1) winding connected to the bases of the two transistors. The polarity of the induced voltage is such that one transistor will be driven towards saturation and the other transistor will be driven towards cut-off. The current will continue to increase until the transformer becomes saturated. At this time, the induced voltage drops towards zero and there is no longer enough base bias to maintain collector current. When this happens, the current starts to decrease, causing a voltage to be induced of opposite polarity, driving the transistor previously turned off towards saturation and driving the previously saturated transistor towards cut-off. This switching action produces a square wave output that is applied to the rectifier/filter assemblies through power transformer T1.

Reverse polarity protection is provided by diode CR1. With the correct polarity applied at the primary input, diode CR1 will be reversed biased. When the polarity is reversed, diode CR1 becomes forward biased, allowing an excessive amount of current to flow through fuse F1. When this happens, fuse F1 will open, instantaneously, thus preventing any damage to occur to the circuit components.

CHAPTER 4

MAINTENANCE

4.1 MAINTENANCE OF SOLID STATE EQUIPMENT

Due to the widespread application of semiconductor devices and printed circuit boards in the transceiver, some deviation from normal servicing practices is required. The special practices recommended in this paragraph should facilitate testing and parts replacement and prevent damage to components.

4.1.1 Testing

In solid state circuits, the impedances and resistances encountered are of much lower values than those encountered in vacuum tube circuits. A difference of a few ohms can greatly affect the performance of the equipment. Also, coupling and filter capacitors require larger values and are usually of the low voltage electrolytic type. Therefore, when measuring low resistances, use an instrument that is very accurate in the low resistance ranges.

WARNING

Since solid state devices may be quickly damaged by excess voltage or current, be sure the ohmmeter used uses batteries less than 7.5 for resistance measurements.

Transistors can usually be checked in the circuit. Using a 20,000 ohms/volt dc voltmeter, check the voltages on each element of the transistor. If the dc voltage is considerably different from that indicated in the voltage measurement chart, check each detail of the circuit for faults. If there are no obvious faults, the transistor, itself, may be defective. Most significant of the dc voltages is the emitter voltage, since in the common emitter circuit, the voltage across the emitter resistor is a good indicator of the dc operating conditions of the stage. In most cases, the difference between the emitter and base voltages should be approximately 0.6 to 0.7 volts.

Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage; therefore, a short or open circuit in the biasing circuit may damage the transistor. A transistor can also be checked out of the circuit as follows, using a sensitive ohmmeter with a low voltage circuit. To check a PNP transistor, connect the positive lead of the ohmmeter to the base of the transistor; connect the negative lead to the emitter and then to the collector. Generally, a resistance reading of 100,000 ohms or more should be obtained between emitter and base or between emitter and collector. Reconnect the meter with the negative lead to the base and the positive lead connected to the emitter. A resistance value of 500 ohms or less should be obtained. When the positive lead is connexted to the collector, a value of 500 ohms or less should be obtained. With the positive lead on the collector and the negative lead on the emitter, the resistance should be high.

Similar tests made on an NPN transistor produce the following results. With the negative lead on the base and the positive lead on the emitter or collector, the resistance should be high. With the positive lead on the base and the negative lead on the emitter or collector, the resistance should be low. With the negative lead on the collector and the positive lead on the emitter, the resistance should be high.

CAUTION

> If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short exists in the circuit, putting in another transistor will most likely result in damaging the new transistor. Do not depend upon fuses to protect transistors. Never remove or replace a semiconductor device with the voltage applied. Transients thus produced can damage them.

Diodes can be checked with an ohmmeter in much the same way as transistors. In the forward direction, the resistance measured should be low; in the reverse direction, the resistance should be very high.

4.1.2 Tracing Printed Circuits

Special composite illustrations of printed circuit boards are provided. These show the board from the component side with the wiring side shown in phantom. Components are identified by schematic reference designators. These illustrations are of particular assistance in tracing circuits on boards which the wiring side is not accessible.

Circuit tracing can be done from either side of the board. Usually, the easiest method is to place a small light behind the board, so that connection points can be seen through the board, and then testing on the component side. Eyelet and wire connections identified both in the assembly view and on the schematic are usually good points to check first, since they are easy to identify and to reach

4.1.3 Replacing Components

Use only a low-heat soldering iron when installing or removing soldered-in parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clean excess solder from mounting eyelets, making sure that mounting holes are clear before installing the new part. When removing a transformer or other part having a multiple number of leads, straighten all leads first and then heat leads one at a time, working around the part, until the part can be gently rocked out. A solder sucker will greatly simplify removal of multiple lead components.

Note

> A toothpick can be used to clear molten solder from holes.

When installing or removing a soldered-in semiconductor, grasp the lead to which heat is being applied, between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise be conducted into the semiconductor device from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be make quickly. Excessive heat will permanently damage a semiconductor.

If the copper-foil wiring is damaged, a piece of small buss wire can be used to bridge the gap. It is seldom necessary to replace a board because of foil breakage.

Capacitors, resistors, and other two-lead components can be replaced without removing the old leads, using the following procedure. This method is not as good as removing old leads, but sometimes it can be used to advantage if access to the printed side of the board is impractical.

a) Cut the component in half with diagonal cutters.

b) Crush the remains of the component, and break the pieces away from the leads. This will provide maximum lead length.

c) Bend the leads close to the board to form a loop.

d) Connect the leads of the new component to the loops formed by the old leads, and solder the connections. Be careful to dress the leads so they don't contact nearby leads.

4.2 TEST EQUIPMENT

The following is a list of test equipment required to properly service the transceiver.

VOM, Simpson Model 260 or equivalent

RF Signal Generator, Hewlett-Packard HP-606A or equivalent

Carrier Deviation Meter, Marconi TF-791D or equivalent

Audio Signal Generator, Hewlett-Packard HP-200AB or equivalent

RF Voltmeter, Boonton 91CA or equivalent

Frequency Counter, Hewlett-Packard 5242L or equivalent

Wattmeter, Micro-Match 711N or equivalent

Dummy Load, 50-ohm, 75-watt

FM Signal Generator, Marconi Type TF-1066B/I or equivalent

Distortion Analyzer, Hewlett-Packard HP-331A or equivalent

4.3 PREVENTIVE MAINTENANCE

Preventive maintenance checks contained in table 4.1 should be performed at regular intervals to ensure proper operation.

4.4 TROUBLESHOOTING PROCEDURES

Table 4.2 contains troubleshooting procedures that can be used as a guide for isolating faults to a particular board or assembly in the transceiver.

4.5 ALIGNMENT PROCEDURES

Complete alignment procedures, tuning adjustments and performance checks are contained in tables 4.3 through 4.13.

TABLE 4.1 - PREVENTIVE MAINTENANCE CHECKS

PREVENTIVE MAINTENANCE CHECK	INTERVAL
1. Check all exterior cables for proper connection. Also check all cables for any signs of damage.	3 months
2. Check primary voltage generating system for proper operation.	As required
3. Keep antenna and antenna base free of dirt and corrosion.	As required
4. Check transmitter frequency and deviation.	12 months
5. Check power input to final	12 months
6. Check receiver frequency.	12 months

TABLE 4.2 - TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	PROCEDURE
1. Set completely dead.	a. No primary supply voltage.	a. Check for correct primary supply voltage.
	b. Primary power fuse open.	b. Replace, if defective, and check primary circuit for possible short circuit.
	c. Faulty power switch.	c. Check switch for proper operation, and replace if defective.
2. No transmit or receive signals on all channels.	a. Faulty dc/ac inverter.	a. Make V/R check, figure 4.19 or 4.20.
	b. Faulty rectifier/filter assembly.	b. Make V/R check, figure 4.16 or 4.17.
	c. Faulty +10 vdc regulator on receiver assembly.	c. Make V/R check, figure 4.12.
	d. Faulty oscillator assembly.	d. Make V/R check, figure 4.14.
	e. Faulty antenna circuit.	e. Check antenna circuit to set.
	f. Faulty antenna low pass filter.	f. Check antenna low pass filter, figures 4.5, 4.9 through 4.11.
	g. Faulty exciter assembly.	g. Make V/R check, figure 4.13.
	h. Faulty receiver assembly.	h. Make V/R check, figure 4.12.

TABLE 4. 2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
3. No transmitted signals, receive signals present.	a. Faulty relay K1 or K2.	a. Check relay K1 and K2 for proper operation. Replace if defective.
	b. Faulty push-to-talk switch on handset or microphone.	b. Check push-to-talk switch for proper operation. Replace or repair as required.
	c. Faulty rectifier/filter assembly.	c. Make V/R check, figure 4. 16 or 4. 17.
	d. Broken connection on Channel Selector switch S4.	d. Check Channel Selector switch S4. Repair as required.
	e. Exciter assembly inoperative.	e. Make V/R check, figure 4. 13. Replace defective component. Realign exciter assembly, table 4. 10. If driver current is excessively high or low, check PA assembly before checking exciter assembly.
	f. Faulty PA assembly.	f. Make V/R check, figure 4. 15.
	g. Defective power amplifier tube V1.	g. Check power amplifier tube V1. Replace if defective. Retune PA assembly, table 4. 11.
4. Transmitter inoperative on one channel, all other channels operative in transmit and receive.	a. No injection frequency from oscillator assembly.	a. Check oscillator selection circuit and crystal associated with inoperative channel. Repair as required and readjust frequency, table 4. 13.

TABLE 4.2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
5. No receive signals, transmitter operative.	a. Faulty T/R relay K1.	a. Check T/R relay K1 for proper operation.
	b. No injection frequency from oscillator assembly.	b. Make V/R check, figure 4.14.
	c. Faulty multiplier assembly.	c. Make V/R check, figure 4.18. Measure stage gain, figure 4.8.
	d. Faulty receiver assembly.	d. Make V/R check, figure 4.12. Measure stage gain, figure 4.7.
	e. Faulty loudspeaker or handset earpiece.	e. Check loudspeaker or handset earpiece.
6. No receive signals on one channel, all other channels operative.	a. No injection frequency from oscillator assembly.	a. Check oscillator selection circuit and crystal associated with inoperative channel. Repair as necessary and readjust frequency, table 4.5.
7. Unmodulated carrier is transmitted.	a. Faulty audio stages on exciter assembly.	a. Make V/R check of audio stages on exciter assembly, figure 4.13.
	b. Faulty microphone or handset.	b. Check microphone or handset and repair as required.

TABLE 4. 2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
8. Low rf output power on all channels.	a. Faulty exciter assembly.	a. Make V/R check of rf stages on exciter assembly, figure 4. 13. Replace defective component and realign exciter assembly, table 4. 10.
	b. Faulty PA assembly.	b. Make V/R check, figure 4.15.
	c. Defective PA tube V1.	c. Check PA tube V1 and replace if defective. Retune PA assembly A4, table 4. 11.
	d. Faulty rectifier/filter assembly.	d. Make V/R check, figure 4. 16 or 4. 17.
9. Low rf output power on one channel, normal on all other channels.	a. Defective oscillator assembly.	a. Make V/R check, figure 4. 14.
10. Distorted modulation in transmit.	a. Defective microphone or handset.	a. Check microphone or handset. Repair as required.
	b. Defective exciter assembly.	b. Make V/R check of audio stages on exciter assembly A2, figure 4. 13.
	c. Defective oscillator assembly.	c. Check frequency of injection signal for channel being distorted. Repair as necessary. Readjust frequency, table 4. 13.

TABLE 4. 2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
11. Received audio signal distorted.	a. Defective oscillator assembly.	a. Check frequency of injection signal for channel producing distortion. Repair as necessary. Readjust frequency, table 4. 5.
	b. Faulty multiplier assembly.	b. Make V/R check, figure 4. 18. Measure stage gain, figure 4. 8.
12. Audio output low.	a. Defective receiver assembly.	a. Make V/R check, figure 4. 12. Check receiver gain, figure 4. 7.
13. Injection frequency incorrect on one channel, all other channels correct.	a. Crystal trimmer not properly adjusted.	a. Adjust trimmer to set signal at proper frequency, table 4. 5 or 4. 13.
	b. Crystal out of tolerance.	b. Replace crystal, and adjust frequency, table 4. 5 or 4. 13.

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STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
5	Same as Step 4a or b	A1C29 A1C27	Set A1C27 at maximum capacitance. Adjust A1C29 for maximum rf voltmeter indication. Set A1C27 at first maximum indication from maximum capacitance. Do not readjust A1C29.
6	Same as Step 4a or b	A1C17 A1C14	Set A1C14 at maximum capacitance. Adjust A1C17 for maximum rf voltmeter indication. Set A1C14 at first maximum indication from maximum capacitance. Do not readjust A1C17.
7	Same as Step 4a or b	A1C7 A1C3	Adjust A1C3 for minimum rf voltmeter indication. Adjust A1C7 for maximum rf voltmeter indication. Adjust A1C3 for maximum rf voltmeter indication. Do not readjust A1C7. Disconnect all test equipment and reconnect coax wire to pins A7P2, A7P3 (if disconnected in step 4b).

TABLE 4.3 RECEIVER ASSEMBLY A1 ALIGNMENT PROCEDURE

TABLE 4.3 RECEIVER ASSEMBLY A1 ALIGNMENT PROCEDURE

REQUIRED TEST EQUIPMENT

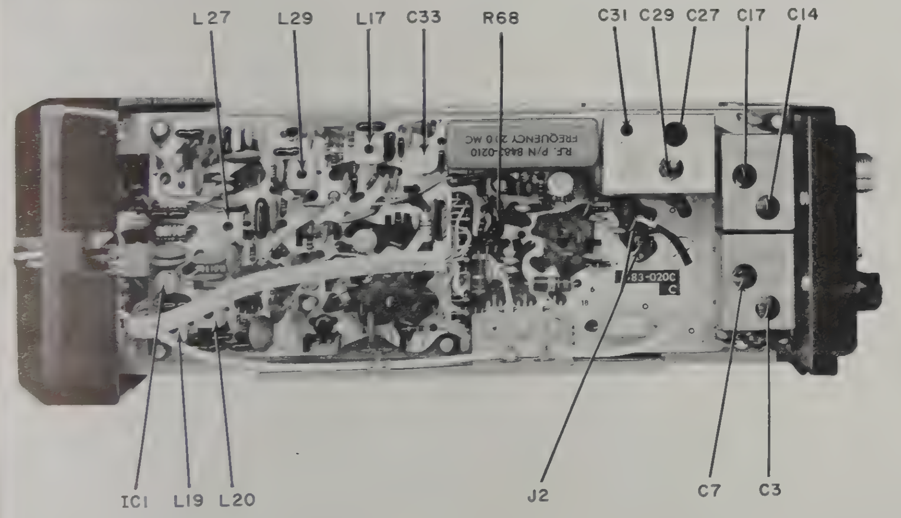
1. RF Signal Generator, Hewlett-Packard HP-606, or equivalent
2. FM Signal Generator, Marconi TF-1066 B/I, or equivalent
3. RF Voltmeter, Boonton 91CA, or equivalent
4. Electronic Frequency Counter, Hewlett-Packard HP-5242, or equivalent

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set CONTROL switch at LOCAL. (RF-401-2 and RF-404-3 only.)
4. Set SPEAKER switch at ON. (RF-401-2 and RF-404-3 only.)
5. For a badly misaligned receiver assembly, set all receiver assembly inductor slugs flush with bottom of board.
6. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

7. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25 vdc indication.



STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	WARNING High voltages, that could be lethal, are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when the chassis is out of the case with power applied.		
1	RF Signal Generator A1J2 RF Voltmeter A1IC1 pin 1	A1C31 A1C33 A1L17 A1L29 A1L27	Disconnect coax wire connected to A1J2. Set rf signal generator frequency at 20.000 MHz (CW). Check frequency on electronic counter and maintain at 20.000 MHz. Adjust rf signal generator output level to obtain rf voltmeter indication 10 dB above noise level. Adjust capacitors and inductors for maximum rf voltmeter indication. Reduce rf signal generator output level to keep rf voltmeter indication below 300 mV. Repeat adjustment until no further increase is obtained on rf voltmeter.
2	RF Signal Generator A1J2 RF Voltmeter A1IC1 pin 5 VOM J5-17 (+), J5-13 (-)	A1L20 A1L19	Set rf signal generator output level at 100 uV. Adjust A1L20 for 0 (zero) indication on VOM and A1L19 for peak indication on rf voltmeter. Repeat adjustment until no further change is obtained on rf voltmeter and VOM. Disconnect rf signal generator, rf voltmeter and VOM. Reconnect coax wire to A1J2.
3	RF Voltmeter A1J2		RF Voltmeter should indicate 500 mV, minimum, on all channels. If indication is less, perform Multiplier Assembly A7 Alignment Procedure before proceeding with this procedure.
4			Calculate the bandwidth in percent, as follows: $\text{BW}(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] \times 100$ F1 = lowest carrier frequency F2 = highest carrier frequency If the calculated bandwidth in percent is less than 0.40%, proceed to step 4a. If the calculated bandwidth is greater than 0.40%, proceed to step 4b.
4a	RF Voltmeter A1IC1 pin 1 FM Signal Generator J1		Set Channel Selector switch at low frequency channel. Set A1C3, A1C7, A1C14, A1C17, A1C27, A1C29, at mid-range. Set fm signal generator controls to produce a CW output at a level of 100 mV at the channel frequency. Carefully adjust fm signal generator frequency to ensure that signal is centered in crystal filter passband. Decrease fm signal generator output level, as required, to keep VTVM indication below 300 mV in the following steps.
4b	RF Signal Generator A7P2, A7P3 RF Voltmeter A1IC1 pin 1 FM Signal Generator J1		Disconnect coax wire from pins A7P2, A7P3. Set A1C3, A1C7, A1C14, A1C17, A1C27, A1C29 at mid-range. Set rf signal generator output level at 600 mV (measured across A7P2, A7P3) at frequency calculated as follows: $f_s = \left(\frac{F1 + F2}{2}\right) \div 8$ F1 = lowest carrier frequency F2 = highest carrier frequency Check rf signal generator frequency on electronic counter. Set fm signal generator at frequency calculated as follows: $f_s = \frac{F1 + F2}{2}$ Set fm signal generator output level at 100 mV. Carefully adjust fm signal generator frequency to ensure that signal is centered in crystal filter passband. Decrease fm signal generator output level, as required, to keep VTVM indication below 300 mV in the following steps.
5	Same as Step 4a or b	A1C29 A1C27	Set A1C27 at maximum capacitance. Adjust A1C29 for maximum rf voltmeter indication. Set A1C27 at first maximum indication from maximum capacitance. Do not readjust A1C29.
6	Same as Step 4a or b	A1C17 A1C14	Set A1C14 at maximum capacitance. Adjust A1C17 for maximum rf voltmeter indication. Set A1C14 at first maximum indication from maximum capacitance. Do not readjust A1C17.
7	Same as Step 4a or b	A1C7 A1C3	Adjust A1C3 for minimum rf voltmeter indication. Adjust A1C7 for maximum rf voltmeter indication. Adjust A1C3 for maximum rf voltmeter indication. Do not readjust A1C7. Disconnect all test equipment and reconnect coax wire to pins A7P2, A7P3 (if disconnected in step 4b).

TABLE 4.3 RECEIVER ASSEMBLY A1
ALIGNMENT PROCEDURE

ABLE 4.4   MULTIPLIER ASSEMBLY A7 AL

EQUIRED TEST EQUIPMENT

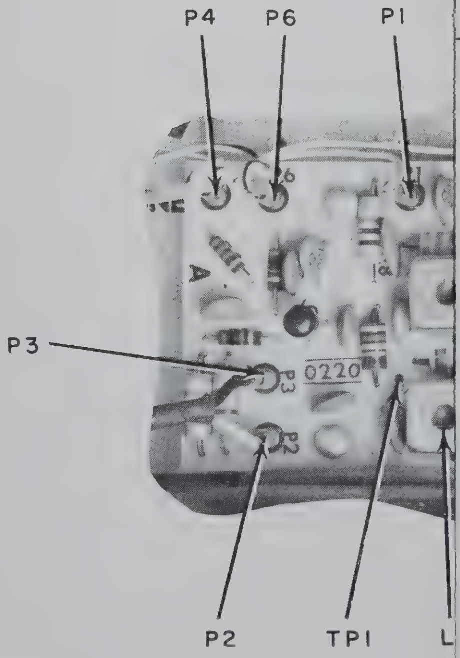
. VOM, Simpson Model 260, or equivalent
. RF Voltmeter, Boonton 91CA, or equivalen
. RF Signal Generator, Hewlett-Packard HP-
. Electronic Frequency Counter, Hewlett-Pa

RELIMINARY CHECKS AND ADJUSTMENTS

. Rotate VOLUME control fully counterclock
. Rotate SQUELCH control fully clockwise.
. Set CONTROL switch at LOCAL (RF-401-2
. Ensure that primary voltage is at proper le

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

. Ensure that voltage, measured between pin
VOM, is at +10 vdc. If not, adjust A1R68 t
NOTE: On RF-403-2 used in land mobile i
vdc indication.



MULTIPLIER AS

TUNING JUSTMENT	PROCEDURE
WARNING various points on the chassis and pins 1 through 4 of test socket J5. Use extreme applied.	
	Calculate the bandwidth, in percent as follows: $\mathrm{BW}(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] \times 100$ F1 = lowest carrier frequency F2 = highest carrier frequency If the calculated bandwidth, in percent, is less than 0.40%, proceed to step 1a. If calculated bandwidth is greater than 0.40%, proceed to step 1b.
A7L5 A7L4 A7L6	Set Channel Selector switch at low frequency channel. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Repeat until no further increase is observed on rf voltmeter. Disconnect rf voltmeter.
A7L5 A7L4 A7L6	Disconnect coax wire from A7P2, A7P3. Set rf signal generator output level at 600 mV (measured across A7P2, A7P3) at frequency calculated as follows: $f_s = \left(\frac{F1 + F2}{2} - 20\right) \div 8$ F1 = lowest carrier frequency F2 = highest carrier frequency Check rf signal generator frequency on electronic counter. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Disconnect rf voltmeter.
Note scale) connect positive lead to 50 uA jack and set range selector switch at	
A7L5 A7L4 A7L6	Adjust A7L5, A7L4, A7L6 for maximum VOM indication. Disconnect VOM.
A7L10	Adjust A7L10 for maximum rf voltmeter indication.
A7L11	Adjust A7L11 for maximum rf voltmeter indication. Repeat steps 2 through 4 until no further increase is observed on rf voltmeter. Disconnect test equipment and reconnect coax wire to A7P2, A7P3, if disconnected in step 1b.

TABLE 4.4 MULTIPLIER ASSEMBLY A7
ALIGNMENT PROCEDURE

BLE 4.4 MULTIPLIER ASSEMBLY A7 ALIGNMENT PROCEDURE

UIRED TEST EQUIPMENT

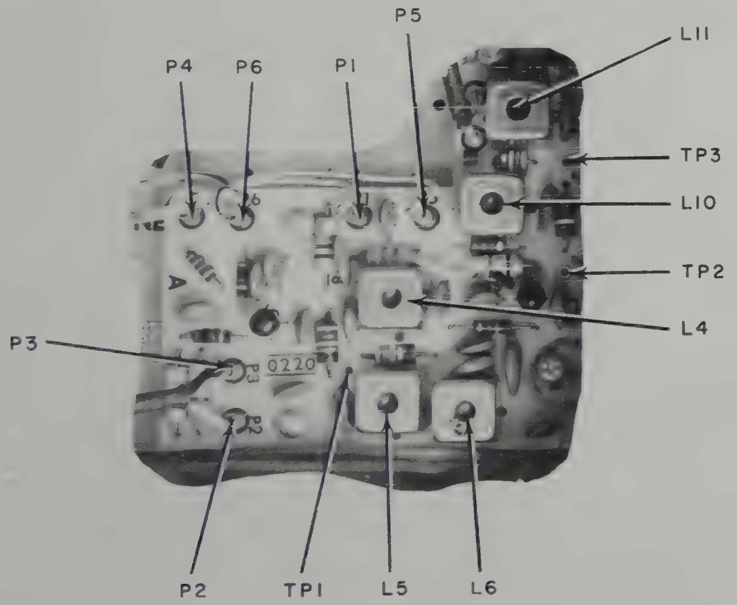
VOM, Simpson Model 260, or equivalent
RF Voltmeter, Boonton 91CA, or equivalent
RF Signal Generator, Hewlett-Packard HP-606A, or equivalent
Electronic Frequency Counter, Hewlett-Packard HP-5242, or equivalent

LIMINARY CHECKS AND ADJUSTMENTS

Rotate VOLUME control fully counterclockwise.
Rotate SQUELCH control fully clockwise.
Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
Ensure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 vdc indication.



MULTIPLIER ASSEMBLY A7

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	WARNING High voltages, that could be lethal are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when chassis is out of the case with power applied.		
1			Calculate the bandwidth, in percent as follows: $\mathrm{BW}(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] \times 100$ F1 = lowest carrier frequency F2 = highest carrier frequency If the calculated bandwidth, in percent, is less than 0.40%, proceed to step 1a. If calculated bandwidth is greater than 0.40%, proceed to step 1b.
1a	RF Voltmeter A7Q2 Base	A7L5 A7L4 A7L6	Set Channel Selector switch at low frequency channel. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Repeat until no further increase is observed on rf voltmeter. Disconnect rf voltmeter.
1b	RF Voltmeter A7Q2 Base RF Signal Generator A7P2, A7P3	A7L5 A7L4 A7L6	Disconnect coax wire from A7P2, A7P3. Set rf signal generator output level at 600 mV (measured across A7P2, A7P3) at frequency calculated as follows: $f_s = \left(\frac{F1 + F2}{2} - 20\right) \div 8$ F1 = lowest carrier frequency F2 = highest carrier frequency Check rf signal generator frequency on electronic counter. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Disconnect rf voltmeter.
	Note To set up Simpson 260 VOM for 250 mV range (full scale) connect positive lead to 50 uA jack and set range selector switch at 50-volt range.		
2	VOM (250 mV) J5-20(+), J5-13 (-)	A7L5 A7L4 A7L6	Adjust A7L5, A7L4, A7L6 for maximum VOM indication. Disconnect VOM.
3	RF Voltmeter A1J2	A7L10	Adjust A7L10 for maximum rf voltmeter indication.
4	Same as Step 3	A7L11	Adjust A7L11 for maximum rf voltmeter indication. Repeat steps 2 through 4 until no further increase is observed on rf voltmeter. Disconnect test equipment and reconnect coax wire to A7P2, A7P3, if disconnected in step 1b.

TABLE 4.4 MULTIPLIER ASSEMBLY A7 ALIGNMENT PROCEDURE

TABLE 4. 5 RECEIVER FREQUENCY CHECI

REQUIRED TEST EQUIPMENT

1. Electronic Frequency Counter, Hewlett-Pa

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockv
2. Set CONTROL switch at LOCAL (RF-401-2
3. Ensure that primary voltage is at proper le

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

4. Ensure that voltage, measured between pins VOM, is at +10 vdc. If not, adjust A1R68 t NOTE: On RF-403-2 used in land mobile in vdc indication.

TUNING DJUSTMENT	PROCEDURE
	Set Channel Selector switch at channel to be checked. The crystal frequency indication observed on the frequency counter should be within ±10 cycles of crystal frequency for channel being checked. If indication is incorrect, proceed with step 2 to adjust the crystal frequency.
	Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Adjust this trimmer to obtain an indication of the crystal frequency that is within ±10 cycles of crystal frequency. Repeat steps 1 and 2 for remaining channels.

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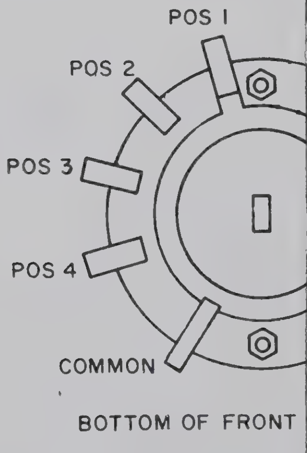
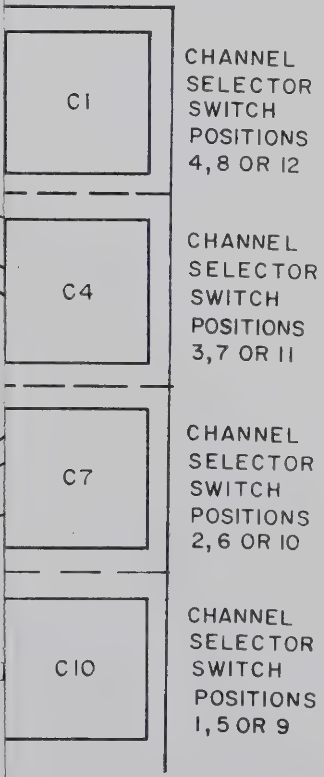


RF-403-2 (4-CHANNEL)
SELECTOR SWITCH S4,


C1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
C4
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
C7
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
C10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

IBLY A3 (PARTIAL VIEW)
L/TRIMMER LOCATION

TABLE 4. 5 RECEIVER FREQUENCY CHECK/
ADJUSTMENT PROCEDURE

LE 4. 5 RECEIVER FREQUENCY CHECK/ADJUSTMENT PROCEDURE

UIRED TEST EQUIPMENT

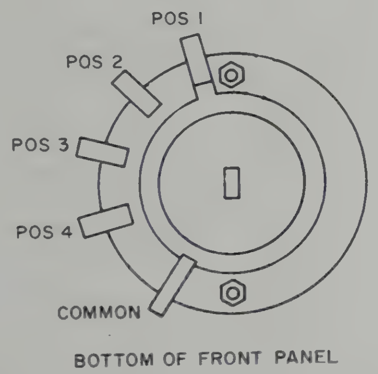
lectronic Frequency Counter, Hewlett-Packard HP-5242 or equivalent

LIMINARY CHECKS AND ADJUSTMENTS

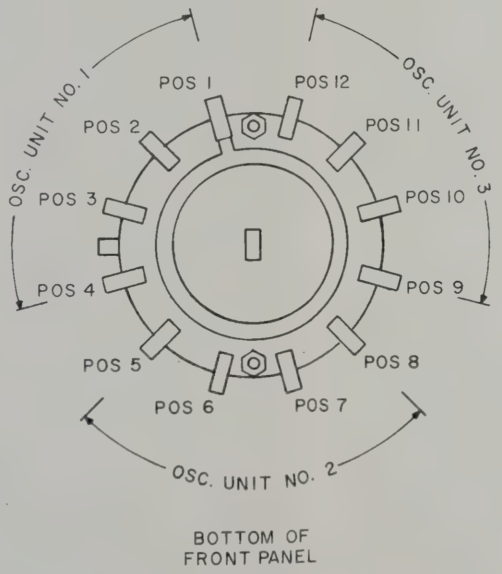
otate VOLUME control fully counterclockwise.
et CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
nsure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

nsure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with OM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
OTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 dc indication.

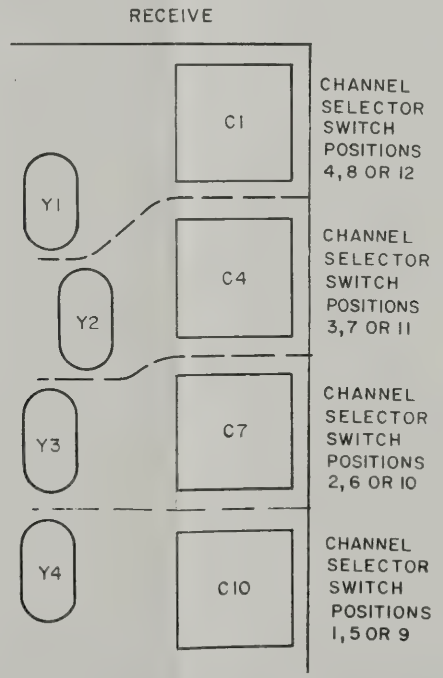


RF-403-2 (4-CHANNEL) CHANNEL SELECTOR SWITCH S4, REAR VIEW



RF-401-2, RF-404-3 CHANNEL SELECTOR SWITCH S4, WAFER A, REAR VIEW

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
1	Frequency counter A7P2 (+), A7P3 (-)		Set Channel Selector switch at channel to be checked. The crystal frequency indication observed on the frequency counter should be within ±10 cycles of crystal frequency for channel being checked. If indication is incorrect, proceed with step 2 to adjust the crystal frequency.
2	Same as step 1		Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Adjust this trimmer to obtain an indication of the crystal frequency that is within ±10 cycles of crystal frequency. Repeat steps 1 and 2 for remaining channels.


RECEIVE
C1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
Y1
C4
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
Y2
C7
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
Y3
Y4
C10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

OSCILLATOR ASSEMBLY A3 (PARTIAL VIEW)
RECEIVE CRYSTAL/TRIMMER LOCATION

TABLE 4. 5 RECEIVER FREQUENCY CHECK/
ADJUSTMENT PROCEDURE

TABLE 4. 6 QUIETING SENSITIVITY MEASUREMENT

REQUIRED TEST EQUIPMENT

1. FM Signal Generator, Marconi TF-1066 B/I, or equivalent
2. AC VTVM, Ballantine 314A, or equivalent

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
4. Set SPEAKER switch at ON (RF-401-2 and RF-404-3 only).
5. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

6. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication. NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 vdc indication.

STEP	TEST EQUIPMENT AND CONNECTION POINT	PROCEDURE
1	AC VTVM J5-15 (+), J5-13 (-)	Set Channel Selector switch at channel to be checked. Adjust VOLUME control to obtain AC VTVM indication as shown below. RF-401-2 1. 8 volts rms RF-403-2 1. 8 volts rms RF-404-3 4. 0 volts rms
2	FM Signal Generator J1 (Antenna)	Set fm signal generator frequency controls to produce an output at the channel frequency at 10 uV (CW). Decrease fm signal generator output level to obtain an AC VTVM indication that is 20 dB down from indication in step 1. Adjust fm signal generator frequency control to obtain maximum quieting. Re-adjust fm signal generator output level to obtain AC VTVM indication that is 20 dB down from indication in step 1. The fm signal generator indicated output level should be 0. 5 uV or less.

TABLE 4.7 SQUELCH SENSITIVITY MEASUREMENT

REQUIRED TEST EQUIPMENT

1. FM Signal Generator, Marconi TF-1066 B/I or equivalent.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
4. Set SPEAKER switch at ON (RF-401-2 and RF-404-3 only).
5. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

6. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication. NOTE: On RF-403-2 used in land and mobile installations, set A1R68 to obtain a +9.25 vdc indication.

STEP	TEST EQUIPMENT AND CONNECTION POINT	PROCEDURE
1	FM signal generator J1 (Antenna)	Set Channel Selector switch at channel to be checked. Set fm signal generator controls to produce an output at the channel frequency at a 0.5 uV level, with a modulating frequency of 1.0 kHz. Set deviation at ±3.3 kHz. Adjust fm signal generator frequency control for maximum receiver audio output. Set fm signal generator output level control for no output. Rotate SQUELCH control counterclockwise until receiver is just squelched. Slowly increase fm signal generator output level until squelch threshold is just overridden. The fm signal generator output level should be 0.35 uV or less.

TABLE 4. 8 AUDIO OUTPUT POWER AND DISTORTION MEASUREMENT

REQUIRED TEST EQUIPMENT

1. FM Signal Generator, Marconi TF-1066 B/I, or equivalent
2. Distortion Analyzer, Hewlett-Packard HP-331A, or equivalent

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set SPEAKER switch at ON (RF-401-2 and RF-404-3 only).
4. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
5. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

6. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication. NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 vdc indication.

STEP	TEST EQUIPMENT AND CONNECTION POINT	PROCEDURE
1	FM Signal Generator J1 (Antenna)	Set Channel Selector switch at channel to be checked. Set fm signal generator controls to produce an output at the channel frequency at a 100 uV level with a modulating frequency of 1 kHz. Set deviation at ±3. 3 kHz.
2	Distortion Analyzer J5-15 (+), J5-13 (-)	Set distortion analyzer controls to measure audio output voltage. Adjust VOLUME control to obtain indication as shown below: RF-401-2 3. 5 volts rms RF-403-2 3. 5 volts rms RF-404-3 8. 0 volts rms Set distortion analyzer controls to measure distortion. The distortion indicated should not exceed 10%.

ABLE 4. 9 RECEIVER NETTING PROCEDU

NOTE

The following procedure allows a
out having to use a frequency cou
intended to replace the receiver f
(table 4. 5) and is provided for E

REQUIRED TEST EQUIPMENT

. VOM, Simpson 260, or equivalent

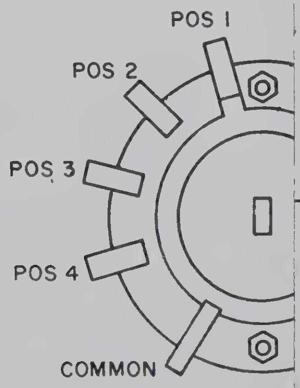
PRELIMINARY CHECKS AND ADJUSTMENTS

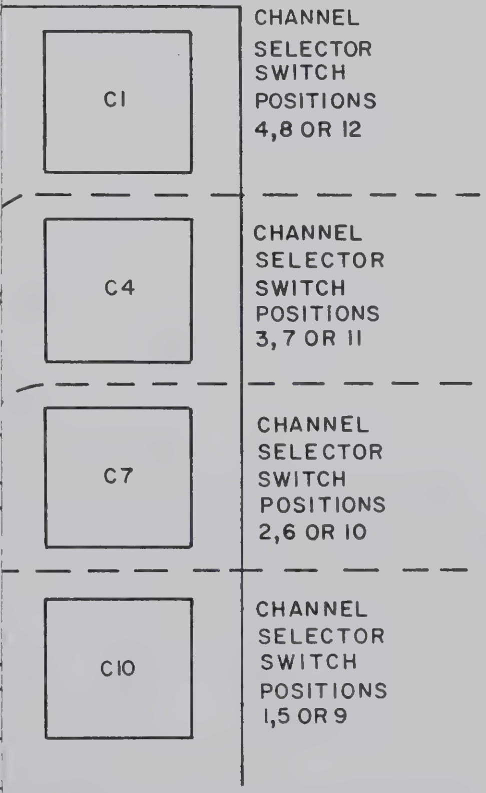
. Rotate VOLUME control fully counterclockw
. Rotate SQUELCH control fully clockwise.
. Set SPEAKER switch at ON (RF-401-2 and F
. Set CONTROL switch at LOCAL (RF-401-2 a
. Ensure that primary voltage is at proper lev

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

. Ensure that voltage, measured betwen pins
VOM, is at +10 vdc. If not adjust A1R68 to
NOTE: On RF-403-2 used in land mobile in
vdc indication.

TUNING JUSTMENT	PROCEDURE
scale), connect positive lead to 50-microamp jack and set range selector	
	Set Channel Selector switch at channel to be netted. Looking at the rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer by referring to figures below. With a signal (from the transmitter to which the receiver is being netted) applied to the receiver, adjust trimmer to obtain a 0 vdc indication on the VOM.
	Repeat step 1 for remaining channels. Disconnect VOM.




C1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
C4
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
C7
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
C10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

BOTTOM OF FRONT

ASSEMBLY A3 (PARTIAL VIEW)

RF-403-2 (4-CHANNEL

RYSTAL/TRIMMER LOCATION

SELECTOR SWITCH S4,

9 RECEIVER NETTING PROCEDURE

NOTE

The following procedure allows adjustment of the receiver without having to use a frequency counter. This procedure is not intended to replace the receiver frequency adjustment procedure (table 4. 5) and is provided for EMERGENCY use only.

D TEST EQUIPMENT

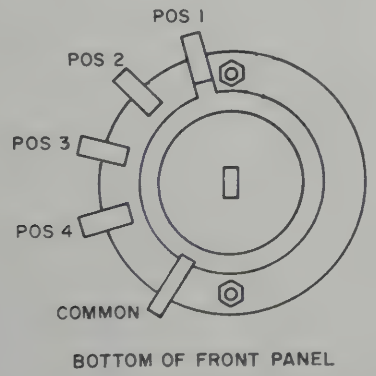
Simpson 260, or equivalent

NARY CHECKS AND ADJUSTMENTS

e VOLUME control fully counterclockwise.
e SQUELCH control fully clockwise.
PEAKER switch at ON (RF-401-2 and RF-404-3 only).
ONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
e that primary voltage is at proper level as follows:

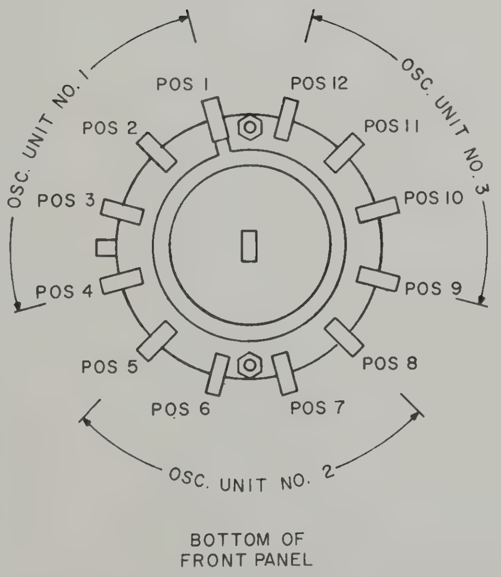
RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

e that voltage, measured betwen pins 14 (+) and 13 (-) of test socket J5 with , is at +10 vdc. If not adjust A1R68 to obtain +10 vdc indication.
E: On RF-403-2 used in land mobile installation, set A1R68 to obtain a +9. 25 ndication.

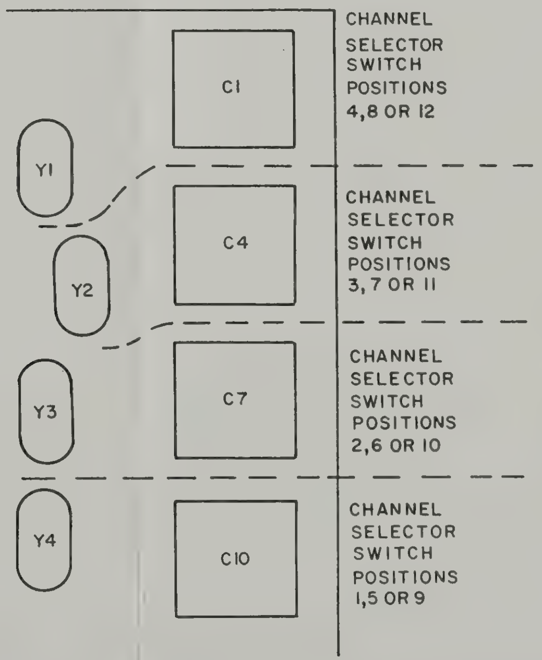


RF-403-2 (4-CHANNEL) CHANNEL SELECTOR SWITCH S4, REAR VIEW

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	To set up Simpson 260 VOM for 250 mV range (full scale), connect positive lead to 50-microamp jack and set range selector switch at 50-volt range.		
1	VOM (250 mV) J5-17 (+), J5-13 (-)		Set Channel Selector switch at channel to be netted. Looking at the rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer by referring to figures below. With a signal (from the transmitter to which the receiver is being netted) applied to the receiver, adjust trimmer to obtain a 0 vdc indication on the VOM.
2	Same as step 1		Repeat step 1 for remaining channels. Disconnect VOM.



RF-401-2, RF-404-3 CHANNEL SELECTOR SWITCH S4, WAFER A, REAR VIEW


C1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
Y1
C4
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
Y2
Y3
C7
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
Y4
C10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

OSCILLATOR ASSEMBLY A3 (PARTIAL VIEW) RECEIVE CRYSTAL/TRIMMER LOCATION

TABLE 4. 9 RECEIVER NETTING PROCEDURE

TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
VOM (250 mV) J5-5 (+), J5-10 (-)	A2C60	Key transmitter and adjust A2C60 to obtain 175 mV indication on VOM. Unkey. Disconnect rf signal generator from A2J1 and reconnect coax wire to A2J1.

TABLE 4.10 EXCITER ASSEMBLY A2 ALIGNMENT PROCEDURE

TABLE 4.10 EXCITER ASSEMBLY A2 ALIGNMENT PROCEDURE

REQUIRED TEST EQUIPMENT

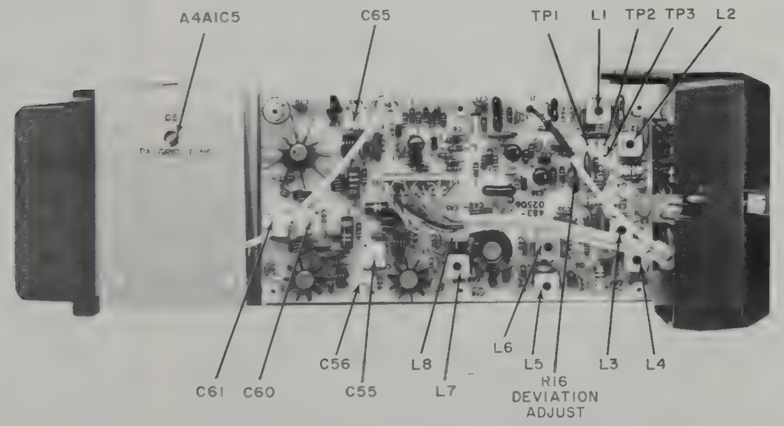
1. VOM, Simpson Model 260 or equivalent
2. Dummy Load, 50-ohm, 100 watt

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
3. Set TUNE/OPERATE switch at TUNE.
4. Set all Exciter Assembly capacitors at minimum capacitance.
5. Carefully rotate Exciter Assembly inductor slugs fully counterclockwise (minimum inductance).
6. Set all PA Assembly capacitors at minimum capacitance.
7. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

8. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
   NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25 vdc indication.



EXCITER ASSEMBLY A2

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	WARNING High voltages, that could be lethal, are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when chassis is out of the case with power applied.		
	CAUTION Do not keep transmitter keyed any longer than is required to make adjustment.		
	CAUTION When moving VOM leads on test socket J5, remove both leads to prevent possible damage to equipment.		
1			Calculate bandwidth, in percent, as follows: $BW(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] \times 100$ F1 = lowest carrier frequency F2 = highest carrier frequency If calculated bandwidth, in percent, is less than 0.40%, proceed to step 1a. If calculated bandwidth is greater than 0.40%, proceed to step 1b.
1a	VOM (2.5 volt) J5-6 (+), J5-13 (-)	A2L1 A2L2	Set Channel Selector switch at low frequency channel. Key transmitter and alternately adjust A2L1, A2L2, for maximum VOM indication. Unkey. (When first adjusting A2L1, A2L2, VOM indication may be erratic.) Key transmitter and rotate A2L1 tuning slug counterclockwise to obtain VOM indication of 1/4 of maximum indication. Slowly adjust A2L2 to obtain maximum VOM indication. Slowly rotate A2L1 tuning slug clockwise to obtain maximum VOM indication. Unkey.
1b	VOM (2.5 volt) J5-6 (+), J5-13 (-) RF Signal Generator A2J1	A2L1 A2L2	Disconnect coax wire from A2J1. Set rf signal generator output level at 900 mV rms (measured at A2J1) at frequency calculated as follows: $f_s = \frac{F1 + F2}{2} \div 12$ F1 = lowest carrier frequency F2 = highest carrier frequency Check frequency on electronic counter. Key transmitter and alternately adjust A2L1 and A2L2 for maximum VOM indication. Unkey. (When first adjusting A2L1 and A2L2, VOM indication may be erratic.) Key transmitter and rotate A2L1 tuning slug counterclockwise to obtain VOM indication of 1/4 of maximum indication. Slowly adjust A2L2 to obtain maximum VOM indication. Slowly rotate A2L1 tuning slug clockwise to obtain maximum VOM indication. Unkey.
2	VOM (2.5 volt) J5-7 (+), J5-13 (-)	A2L4 A2L3	Key transmitter and alternately adjust A2L4 and A2L3 for maximum VOM indication. Unkey. Adjust A2L3, with transmitter keyed, to obtain VOM indication that is 1/4 of maximum VOM indication. Carefully adjust A2L4 to obtain maximum VOM indication, then carefully adjust A2L3 to obtain maximum VOM indication. Unkey.
3	VOM (2.5 volt) J5-8 (+), J5-13 (-)	A2L6 A2L5	Key transmitter and alternately adjust A2L6 and A2L5 for maximum VOM indication. Unkey. Adjust A2L5, with transmitter keyed, to obtain VOM indication that is 1/4 of maximum VOM indication. Carefully adjust A2L6 to obtain maximum VOM indication, then adjust A2L5 to obtain maximum VOM indication. Unkey.
	Note To set up Simpson 260 VOM for 250 mV range (full scale), connect positive lead to 50 uA jack and set range selector switch at 50-volt range.		
4	VOM (250 mV) J5-5 (+), J5-9 (-)	A2L8 A2L7	Set A2C65 at maximum capacitance. Key transmitter and alternately adjust A2L8 and A2L7 for maximum VOM indication. Unkey. Adjust A2L7, with transmitter keyed, to obtain VOM indication that is 1/4 of maximum VOM indication. Carefully adjust A2L8 to obtain maximum VOM indication, then adjust A2L7 to obtain maximum VOM indication. Unkey.
5	Same as Step 4	A2C56	Set A2C55 at maximum capacitance. Key transmitter and adjust A2C56 for a dip. Unkey. (If two dips are present, use dip closest to maximum capacitance.)
6	VOM (250 mV) J5-5 (+), J5-10 (-)	A2C61	Set A2C60 at mid-range. Key transmitter and adjust A2C61 for a dip. Unkey. (If two dips are present, use dip closest to maximum capacitance.)
7	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Set A2C65 to minimum capacity. Key transmitter. If indication is greater than 140, or if an indication of 140 can be obtained by increasing A2C65 capacity before a maximum indication is reached, unkey transmitter and set A2C65 to maximum capacity and proceed to step 9. If an indication of 140 is not obtained, tune for the first peak indication from minimum capacity and proceed to step 8.
8	Same as Step 7	A2C65 A2C55	Key transmitter and adjust A2C55 (decrease capacitance) to obtain VOM indication of 140 mV. Unkey. Set A2C65 at maximum capacitance.
9	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A1C5 A2C65	Key transmitter and adjust A4A1C5 for maximum VOM indication. Unkey. If indication can not be obtained, slightly decrease capacitance of A2C65. Key transmitter and readjust A4A1C5 for maximum VOM indication. Unkey. Repeat, as required to obtain a VOM indication.
10	VOM (250 mV) J5-5 (+), J5-9 (-)	A2C56	Set A2C55 at mid-range. Key transmitter and adjust A2C56 for minimum VOM indication. Unkey.
11	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A1C5 A2C65	Key transmitter and alternately adjust A4A1C5, A2C65 for maximum VOM indication. Unkey.
12	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and note VOM indication. Unkey. If indication is 225 mV or less, proceed to step 13. If VOM indication is greater than 225 mV, key transmitter and adjust A2C65 (increase capacitance) to obtain 225 mV indication. Unkey.
13	VOM (10 volt) J5-3 (+), J5-4 (-)	A2C61 A2C60	Key transmitter and alternately adjust A2C61, A2C60 for maximum VOM indication. Unkey.
14	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and note VOM indication. Unkey. If indication is less than 225 mV, proceed to step 15. If indication is greater than 225 mV, key transmitter and adjust A2C65 (increase capacitance) to obtain 225 mV indication. Unkey.
15	VOM (10 volt) J5-3 (+), J5-4 (-)	A2C56 A2C55	Key transmitter and alternately adjust A2C56, A2C55 for maximum VOM indication. Unkey.
16	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and note VOM indication. Unkey. If indication is less than 225 mV, proceed to step 17. If indication is greater than 225 mV, key transmitter and adjust A2C65 (increase capacitance) to obtain 225 mV indication. Unkey.
17			Repeat steps 13 through 16 until no further increase is observed on VOM.
18	VOM (250 mV) J5-5 (+), J5-10 (-)	A2C60	Key transmitter and adjust A2C60 to obtain 175 mV indication on VOM. Unkey.
19	VOM (250 mV) J5-5 (+), J5-9 (-)	A2C55	Key transmitter and adjust A2C55 to obtain 125 mV indication on VOM. Unkey.
20	VOM (250 mV) J5-5 (+), J5-10 (-)	A2C60	Key transmitter and adjust A2C60 to obtain 175 mV indication on VOM. Unkey. Disconnect rf signal generator from A2J1 and reconnect coax wire to A2J1.

TABLE 4.10 EXCITER ASSEMBLY A2 ALIGNMENT PROCEDURE

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
10			Repeat step 6, then step 9.
11			The rf wattmeter should indicate 25 watts (typical) for the 25 watt transceiver and 80 watts (typical) for the 80 watt transceiver. Carefully tighten locking nut on A4A2C1, making sure that setting is not disturbed.

TABLE 4.11 PA ASSEMBLY A4 TUNING PROCEDURE

E 4.11   PA ASSEMBLY A4 TUNING PROCEDURE

NOTE

If PA was initially tuned into a dummy load, this procedure will have to be repeated when transceiver is connected to the antenna.

IRED TEST EQUIPMENT

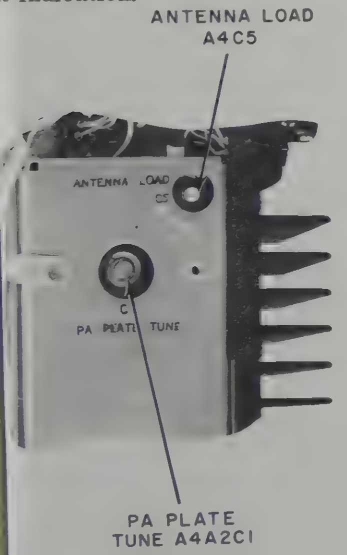
OM, Simpson Model 260, or equivalent
 Wattmeter, Micro-Match 711N, or equivalent
mmy Load, 50-ohm, 100-watt

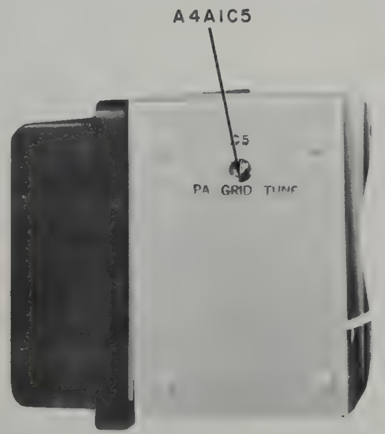
IMINARY CHECKS AND ADJUSTMENTS

tate VOLUME control fully counterclockwise.
t CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
t TUNE/OPERATE switch at TUNE.
osen locking nut on A4A2C1 and set both A4A2C1 and A4C5 at minimum capacitance.
sure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

sure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with
OM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
OTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25
c indication.





STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	Note Do not deviate from procedure. Perform procedure exactly as given.		
	WARNING High voltages, that could be lethal, are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when chassis is out of the case with power applied.		
	CAUTION Do not keep transmitter keyed any longer than is required to make adjustment. When moving VOM leads on test socket J5, remove both leads to prevent possible damage to equipment.		
1	VOM (250 mV) J5-3 (+), J5-4 (-)	A2C65 A4A1C5	Set A2C65 at maximum capacitance. Set Channel Selector switch at high frequency channel. Key transmitter and adjust A4A1C5 to obtain maximum VOM indication. Unkey. Key transmitter and adjust A2C65 to obtain maximum VOM indication. Unkey. Repeat adjustments until no further increase is obtained on VOM.
2	Same as Step 1	A4A1C5	Set Channel Selector switch at low frequency channel. Key transmitter and adjust A4A1C5 to obtain maximum VOM indication. Unkey.
	WARNING PA plate voltage is present at pin 2 of test socket J5 when transmitter is keyed. Therefore, the VOM will be 650 volts dc above ground when connected between pins 1 and 2 of test socket J5 with transmitter keyed.		
3	VOM (2.5 volt) J5-1 (+), J5-2 (-)	A4A2C1	Key transmitter and adjust A4A2C1 for a dip. Unkey. Set TUNE/OPERATE switch at OPERATE. Key transmitter and readjust A4A2C1 for a dip. Unkey.
4	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A1C5	Key transmitter and adjust A4A1C5 for peak indication. Unkey.
5	VOM (2.5 volt) J5-1 (+), J5-2 (-)	A4C5 A4A2C1	Key transmitter and adjust A4C5 for an increase of 0.25 volt on VOM. Unkey. Key transmitter and adjust A4A2C1 for a dip. Unkey. Repeat adjusting A4C5 and A4A2C1 until a VOM indication of 1.65 volts is obtained for a 25 watt transceiver or 2.0 volts for an 80 watt transceiver. Make sure that A4A2C1 is adjusted for a dip as the last step.
6	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A2C5	Key transmitter and set Channel Selector switch alternately at low and high frequency channels, noting VOM indication. Unkey. Adjust A4A2C5, with transmitter keyed, to obtain the same VOM indication at the low and high frequency channels. Unkey.
7	VOM (2.5 volt) J5-1 (+), J5-2 (-)	A4A2C1	Key transmitter and set Channel Selector switch alternately at low and high frequency channels, noting VOM indication. Unkey. Adjust A4A2C1, with transmitter keyed, to obtain the same VOM indication at the low and high frequency channels. **Note** This should be accomplished by setting the Channel Selector switch at the channel producing the highest indication and slowly adjust A4A2C1 to decrease the indication.
8			Repeat steps 6 and 7 until the plate and grid currents are equalized at the high and low frequency channels.
9	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and set Channel Selector switch at each active channel, noting indication produced at each channel. Unkey transmitter and set Channel Selector switch at channel that produced highest indication. Key transmitter and adjust A2C65 (increase capacitance to decrease indication) to obtain VOM indication of 200 mV. Unkey.
10			Repeat step 6, then step 9.
11			The rf wattmeter should indicate 25 watts (typical) for the 25 watt transceiver and 80 watts (typical) for the 80 watt transceiver. Carefully tighten locking nut on A4A2C1, making sure that setting is not disturbed

TABLE 4.11 PA ASSEMBLY A4 TUNING PROCEDURE

ABLE 4. 12 DEVIATION CHECK/ADJUSTME

EQUIRED TEST EQUIPMENT

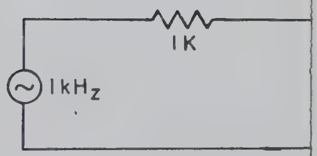
Dummy Load, 50 ohm, 100 watt
Audio Signal Generator, Hewlett-Packard H
Carrier Deviation Meter, Marconi TF-791D
390-ohm, 10%, 1/2 W Resistor
1K, 10%, 1/2 W Resistor

RELIMINARY CHECKS AND ADJUSTMENTS

Rotate VOLUME control fully counterclockw
Set CONTROL switch at LOCAL (RF-401-2 a
Ensure that primary voltage is at proper lev

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

Ensure that voltage, measured between pins
VOM, is at +10 vdc. If not, adjust A1R68 to
NOTE: On RF-403-2 used in land mobile in
vdc indication.



PAD FABRICA
CONNECTION

TUNING JUSTMENT	PROCEDURE
	Set audio signal generator controls to produce an output of 1 kHz at 2 volts rms (measured across pins E and F of J12). Set up carrier deviation meter and key transmitter. Make sure that no audio is applied (through microphone) to the transmitter, when keyed. Adjust audio signal generator frequency control to obtain maximum indication on either positive or negative deviation, whichever is greater. Unkey. Indicated deviation should be 5 kHz. If indication is not correct proceed to step 2.
A2R16	Key transmitter. Make sure that no audio is applied (through microphone) when transmitter is keyed. Adjust A2R16 to obtain deviation indication of 5 kHz, on either positive or negative deviation. Unkey. Disconnect all test equipment.

TABLE 4. 12 DEVIATION CHECK/
ADJUSTMENT PROCEDURE

4. 12 DEVIATION CHECK/ADJUSTMENT PROCEDURE

RED TEST EQUIPMENT

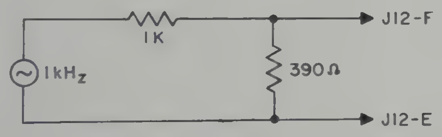
mmy Load, 50 ohm, 100 watt
lio Signal Generator, Hewlett-Packard HP-200AB or equivalent
rrier Deviation Meter, Marconi TF-791D or equivalent
-ohm, 10%, 1/2 W Resistor
10%, 1/2 W Resistor

MINARY CHECKS AND ADJUSTMENTS

ate VOLUME control fully counterclockwise.
CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
sure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

ure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with
M, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
TE: On RF-403-2 used in land mobile installation, set A1R68 to obtain a +9. 25
indication.



PAD FABRICATION AND
CONNECTION DIAGRAM

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
1	Audio signal generator (See figure below)		Set audio signal generator controls to produce an output of 1 kHz at 2 volts rms (measured across pins E and F of J12). Set up carrier deviation meter and key transmitter. Make sure that no audio is applied (through microphone) to the transmitter, when keyed. Adjust audio signal generator frequency control to obtain maximum indication on either positive or negative deviation, whichever is greater. Unkey. Indicated deviation should be 5 kHz. If indication is not correct proceed to step 2.
2	Same as step 1	A2R16	Key transmitter. Make sure that no audio is applied (through microphone) when transmitter is keyed. Adjust A2R16 to obtain deviation indication of 5 kHz, on either positive or negative deviation. Unkey. Disconnect all test equipment.

TABLE 4. 12 DEVIATION CHECK/
ADJUSTMENT PROCEDURE

ABLE 4. 13 TRANSMITTER FREQUENCY CH

EQUIRED TEST EQUIPMENT

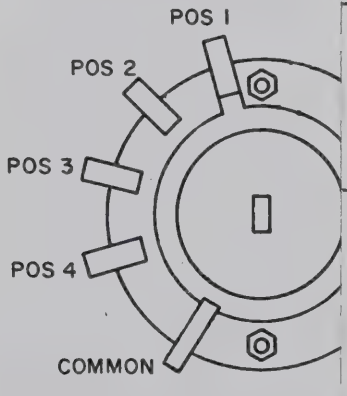
Electronic Frequency Counter, Hewlett-Pack

RELIMINARY CHECKS AND ADJUSTMENTS

Rotate VOLUME control fully counterclockwi
Set CONTROL switch at LOCAL (RF-401-2 a
Ensure that primary voltage is at proper leve

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

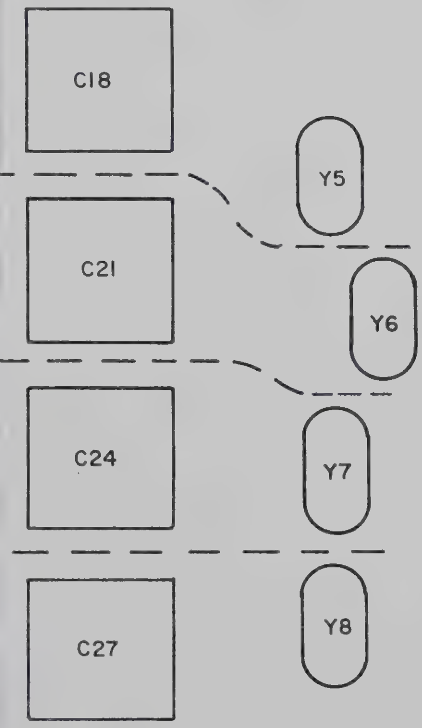
Ensure that voltage, measured between pins
VOM, is at +10 vdc. If not, adjust A1R68 to
NOTE: On RF-403-2 used in land mobile ins
vdc indication.



BOTTOM OF FRONT PA

RF-403-2 (4-CHANNEL) CH
SELECTOR SWITCH S4, RE

TUNING JUSTMENT	PROCEDURE
	Set Channel Selector switch at channel to be checked. Key transmitter and note frequency indication on counter. Unkey. The frequency indication should be within ±100 cycles of channel frequency for channel being checked. Repeat for remaining channels. If indication is incorrect, proceed with step 2.
	Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Key transmitter and adjust this trimmer to obtain an indication that is within ±100 cycles of the channel frequency. Unkey. Repeat for remaining channels.



SSEMBLY A3 (PARTIAL VIEW)
STAL/TRIMMER LOCATION

TABLE 4. 13 TRANSMITTER FREQUENCY CHECK/ADJUSTMENT PROCEDURE

13 TRANSMITTER FREQUENCY CHECK/ADJUSTMENT PROCEDURE

D TEST EQUIPMENT

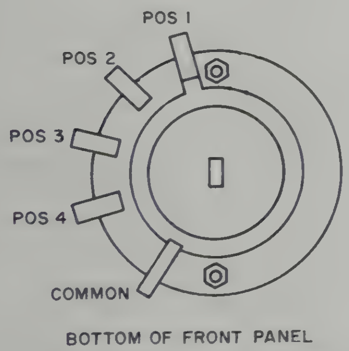
onic Frequency Counter, Hewlett-Packard HP-5242, or equivalent

NARY CHECKS AND ADJUSTMENTS

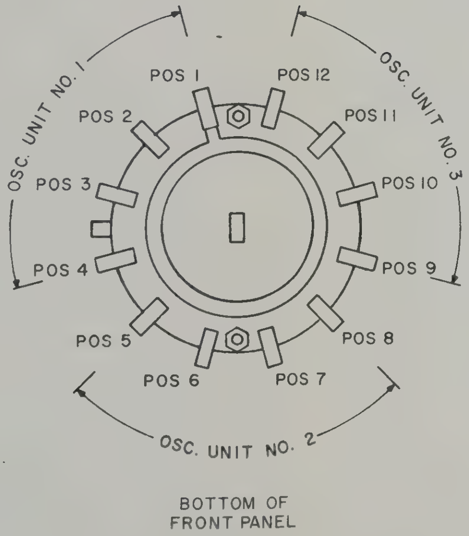
VOLUME control fully counterclockwise.
NTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
e that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

e that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with
is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25
dication.

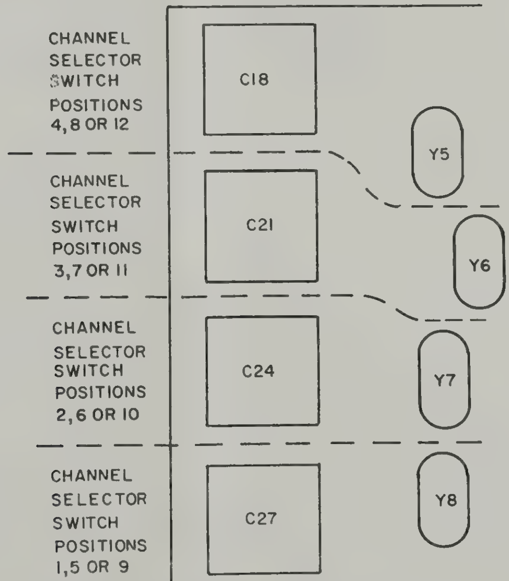


RF-403-2 (4-CHANNEL) CHANNEL SELECTOR SWITCH S4, REAR VIEW



RF-401-2, RF-404-3 CHANNEL SELECTOR SWITCH S4, WAFER A, REAR VIEW

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
1	Frequency Counter J1 (through attenuator)		Set Channel Selector switch at channel to be checked. Key transmitter and note frequency indication on counter. Unkey. The frequency indication should be within ±100 cycles of channel frequency for channel being checked. Repeat for remaining channels. If indication is incorrect, proceed with step 2.
2	Same as step 1		Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Key transmitter and adjust this trimmer to obtain an indication that is within ±100 cycles of the channel frequency. Unkey. Repeat for remaining channels.


CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
C18
Y5
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
C21
Y6
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
C24
Y7
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9
C27
Y8

OSCILLATOR ASSEMBLY A3 (PARTIAL VIEW)
RECEIVE CRYSTAL/TRIMMER LOCATION

TABLE 4.13 TRANSMITTER FREQUENCY CHECK/ADJUSTMENT PROCEDURE

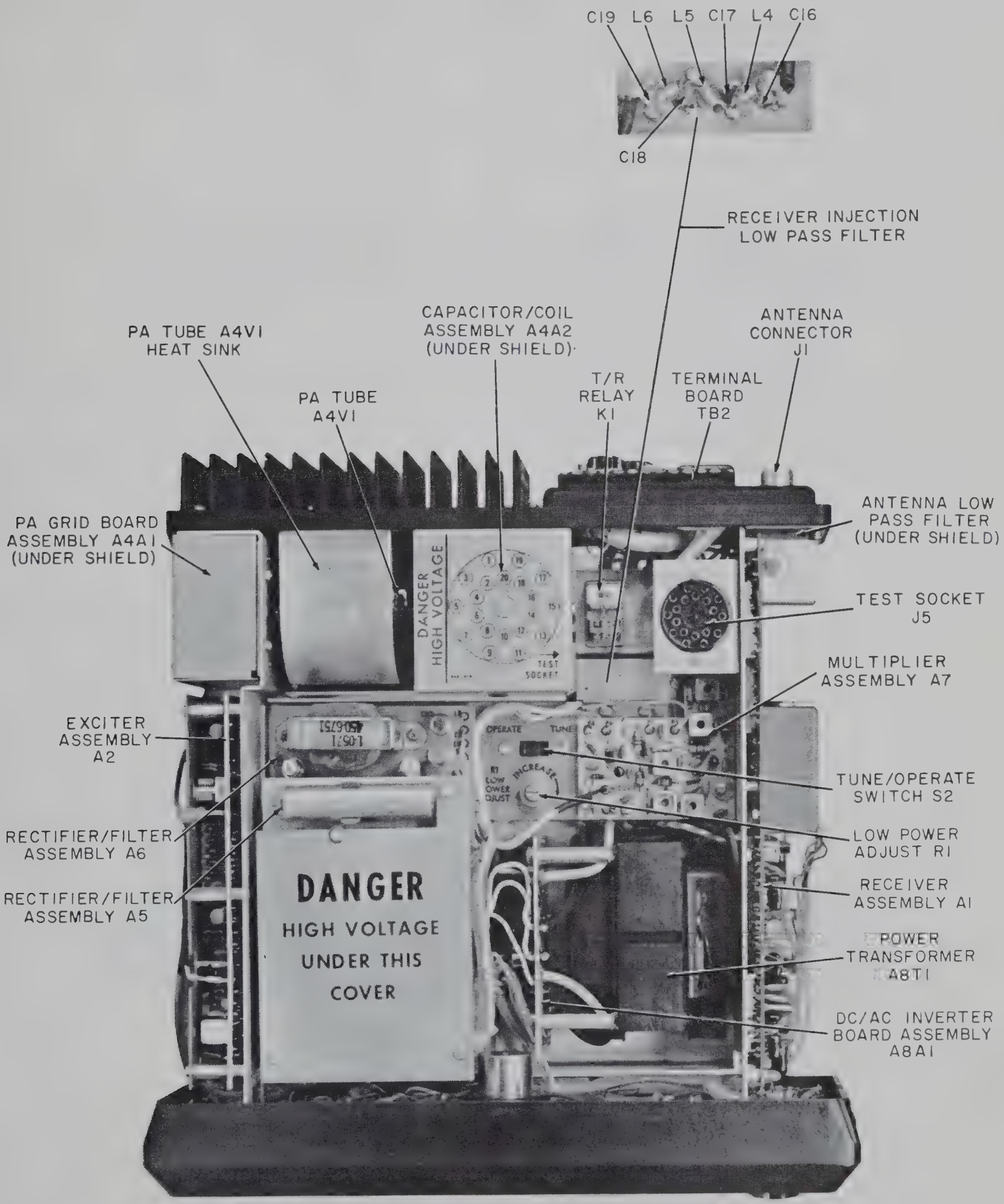


FIGURE 4.1 - RF-401-2 AND RF-404-3
TOP VIEW

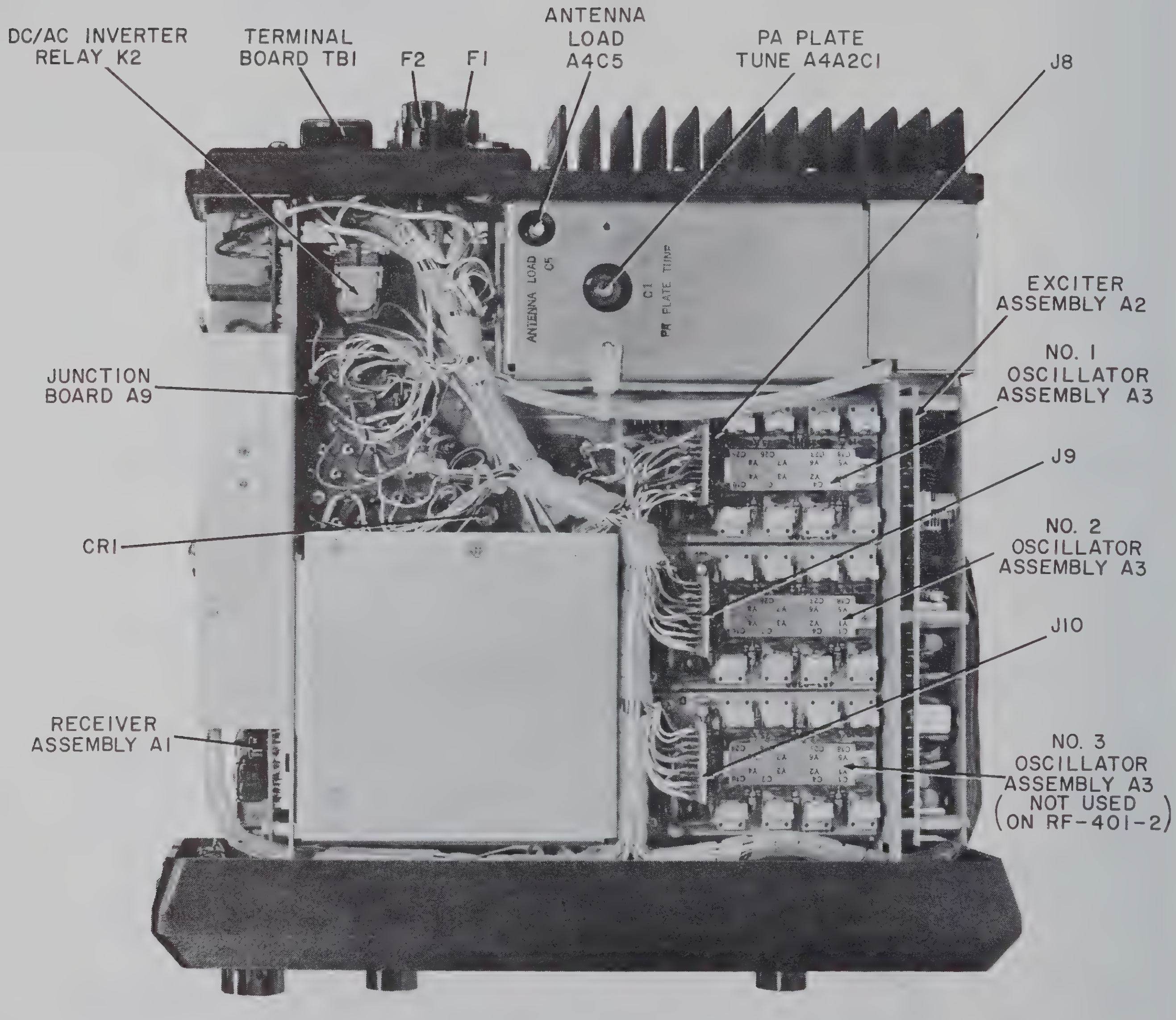


FIGURE 4. 2 - RF-401-2 AND RF-404-3
BOTTOM VIEW

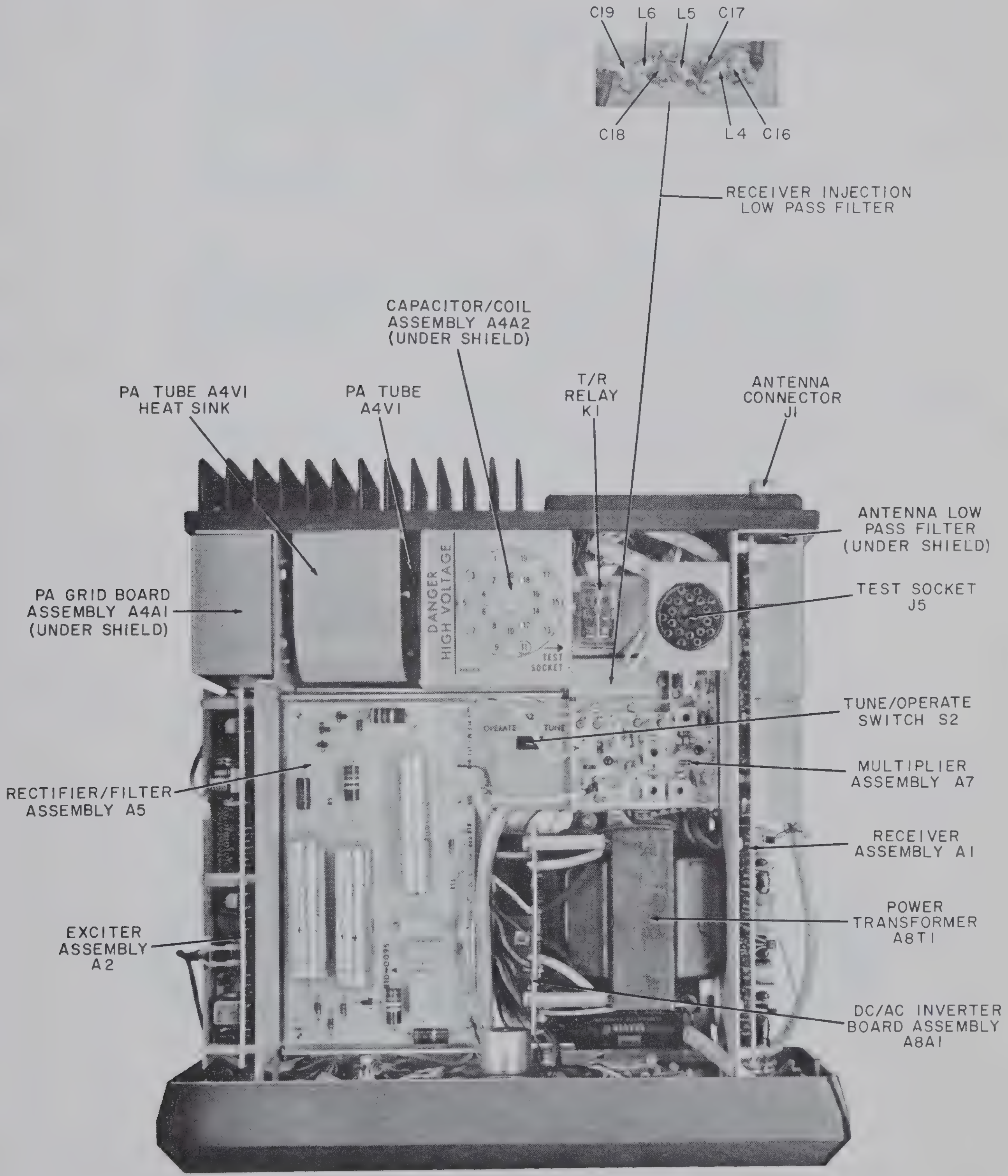


FIGURE 4. 3 - RF-403-2 TOP VIEW

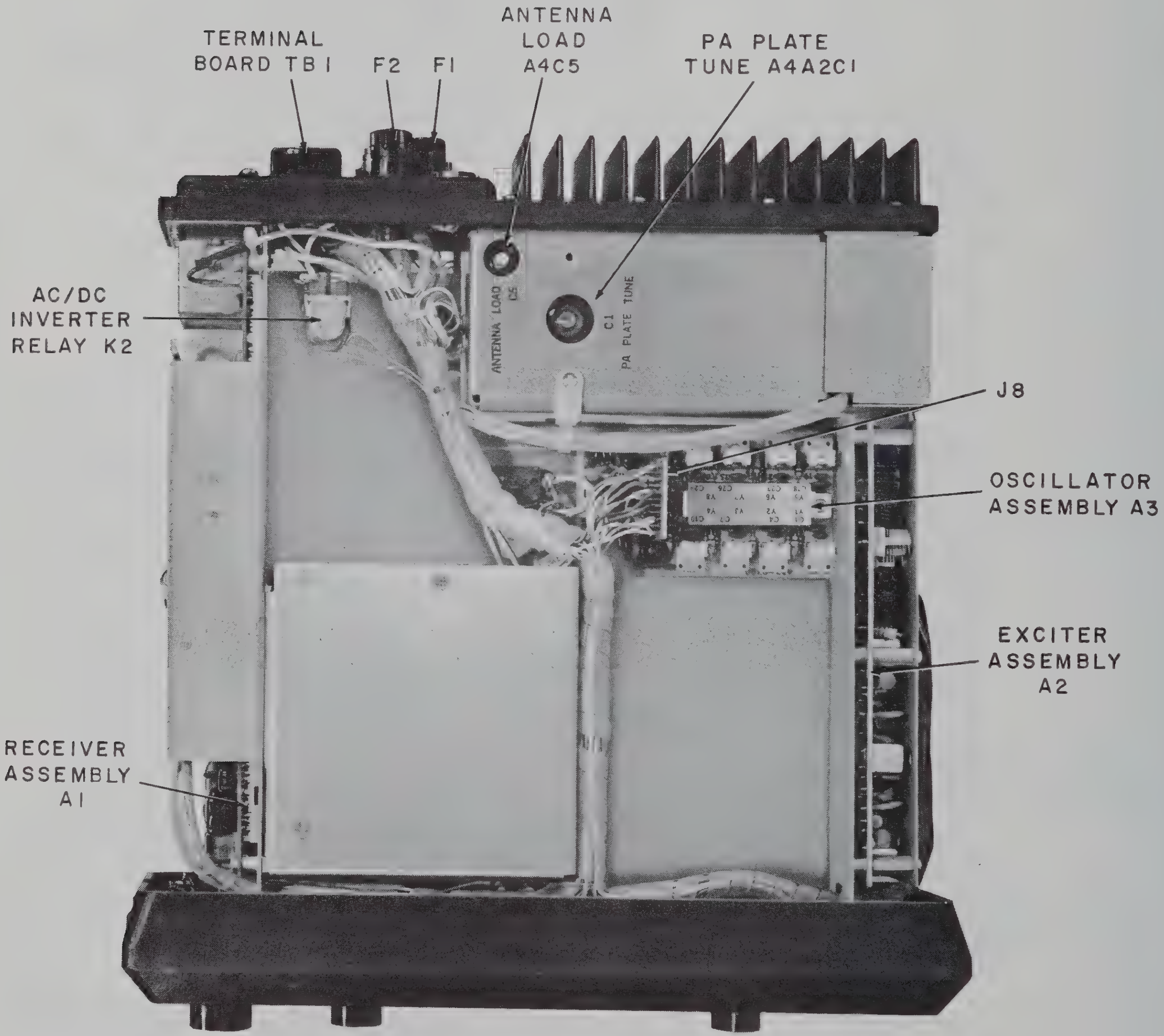
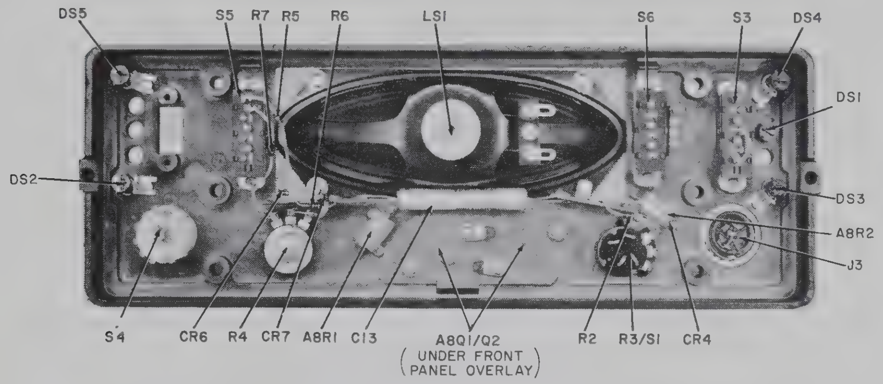
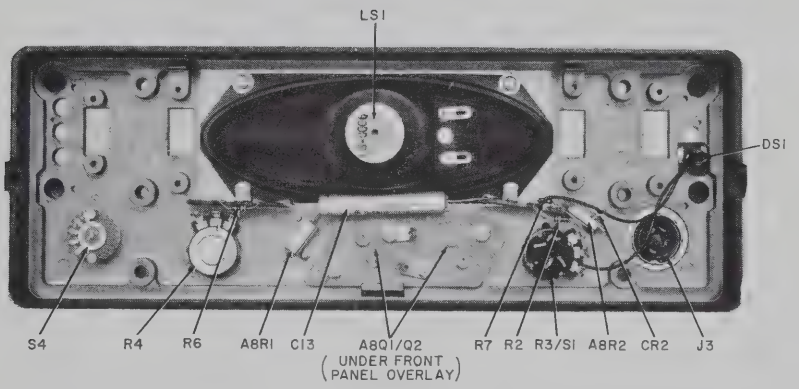


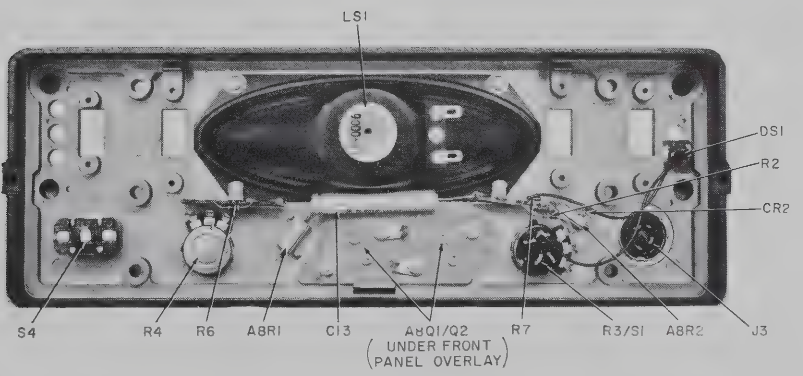
FIGURE 4.4 - RF-403-2 BOTTOM VIEW



(A) RF-401-2 AND RF-404-3



(B) RF-403-2 (4-CHANNEL)



(C) RF-403-2 (2-CHANNEL)

FIGURE 4. 5 - FRONT PANEL PARTS LOCATION (REAR VIEW)

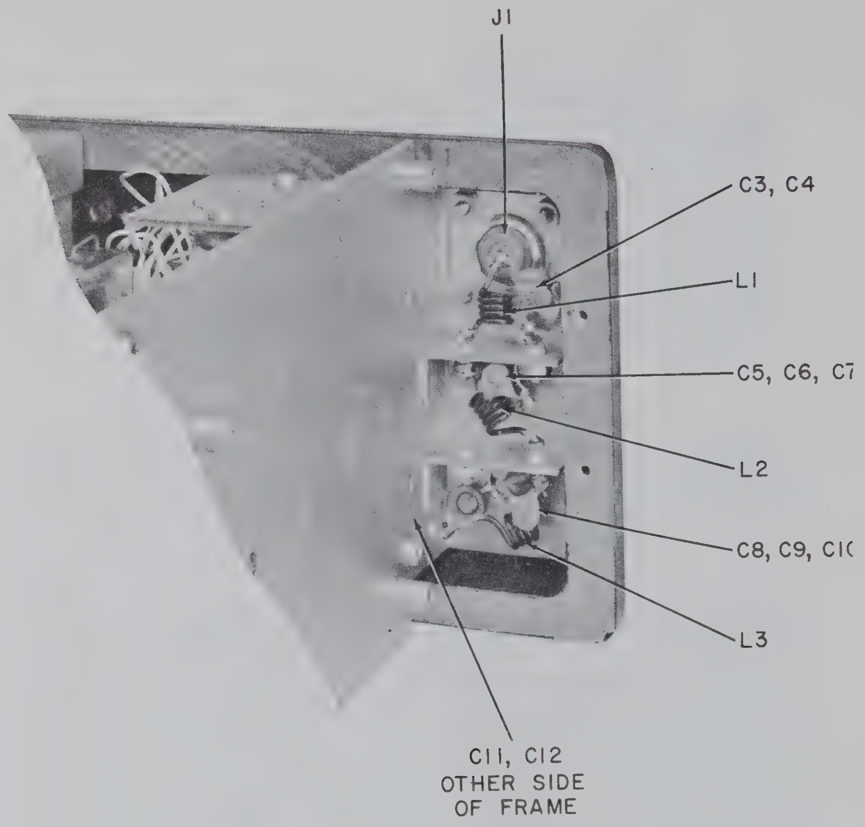
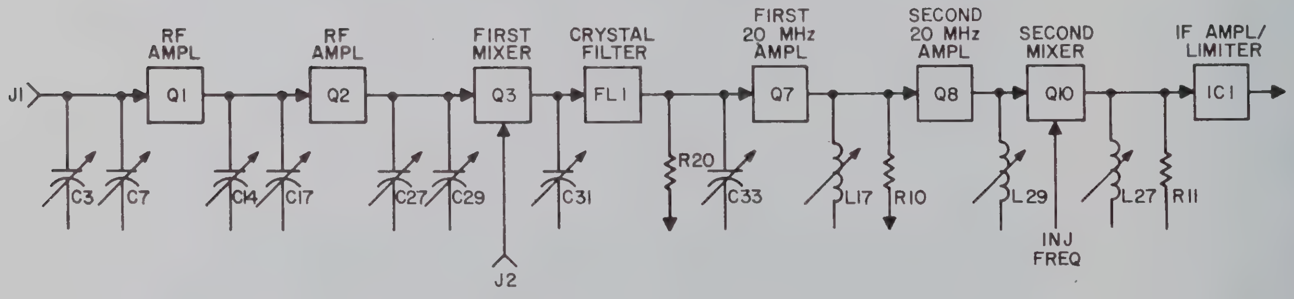
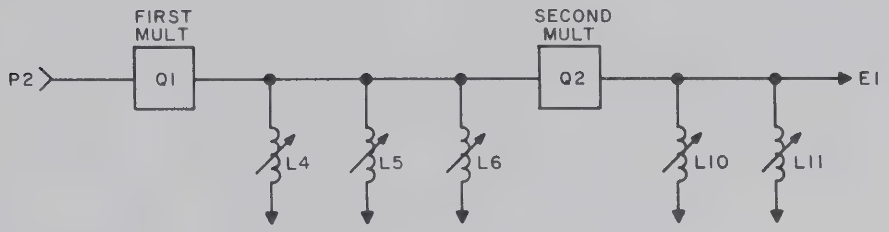


FIGURE 4. 6 - ANTENNA LOW-PASS FILTER PARTS LOCATION



STEP	INPUT AT J1	TEST EQUIPMENT AND TEST POINT	INDICATION
1	CHANNEL FREQUENCY 10 mV	RF VOLTMETER ACROSS R20 TO COMMON	80 mV MIN
2	CHANNEL FREQUENCY 10 mV	RF VOLTMETER ACROSS R10 TO COMMON	80 mV MIN
3	NO INPUT	RF VOLTMETER AT BASE OF Q10 TO COMMON	60 mV MIN
4	CHANNEL FREQUENCY 100μV	RF VOLTMETER ACROSS R11 TO COMMON	200 mV MIN

FIGURE 4. 7 - RECEIVER ASSEMBLY A1 GAIN MEASUREMENT



STEP	TEST EQUIPMENT AND TEST POINT	INDICATION
1	RF VOLTMETER ACROSS P2 AND P3	1 V MIN
2	RF VOLTMETER ACROSS E1 AND E2	400 mV MIN

FIGURE 4. 8 - MULTIPLIER ASSEMBLY A7
GAIN MEASUREMENT

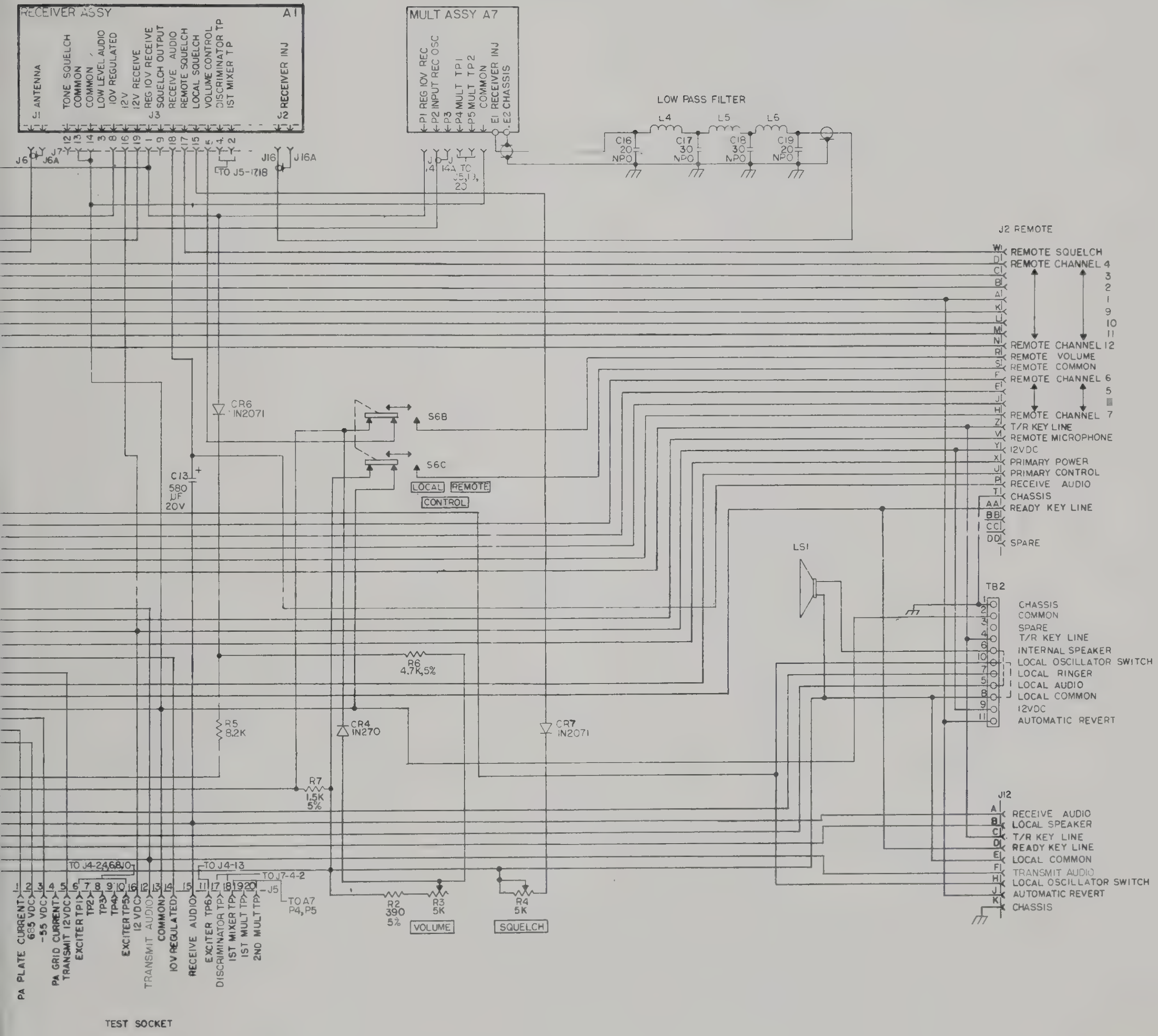


FIGURE 4. 9 - RF-401-2 MAIN FRAME SCHEMATIC DIAGRAM

NOTES

1 ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.

2 ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED.

3 ⏚ DENOTES CHASSIS GROUND.

4 CHANNEL SELECTOR, S4, SHOWN IN POS-1, AS SEEN FROM FRONT.

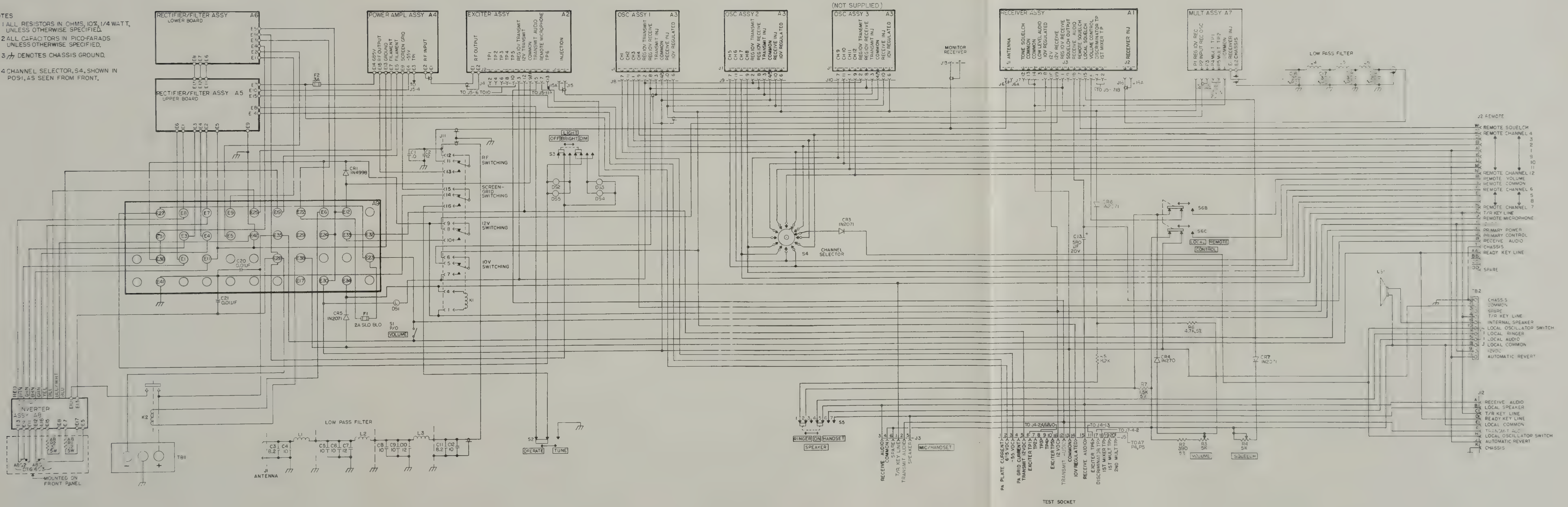


FIGURE 4.9 - RF-401-2 MAIN FRAME SCHEMATIC DIAGRAM

ESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
			RF-401-2 MAIN FRAME				
isc, , 20 pf, 5%, VDCW	C-4745	R6	Res, comp, 4.7K, 5%, 1/4W	R-1265			
		R7	Res, comp, 1.5K, 5%, 1/4W	R-1253			
isc, Cer, 1 uf, +60%, -40%, VDCW	C-0065						
		S1	Power switch, see R3				
		S2	TUNE/OPERATE switch	S-0274			
isc, Cer, 1 uf, +60%, -40%, VDCW	C-0065	S3	LIGHT switch	S-0273			
		S4	Channel Selector switch	A483-0089			
		S5	SPEAKER switch	S-0273			
1N4998	CR-0666	S6	CONTROL switch	S-0272			
1N2071	CR-0001	TB1	Terminal Block, 3 terminals	TB-0473			
1N2071	CR-0001						
1N270	CR-0047	TB2	Terminal Block, 11 terminals	TB-0507			
1N2071	CR-0001						
1N2071	CR-0001	XDS1 Through XDS5	Socket, light	X-1011			
1N2071	CR-0001						
Transmit	DS-0073						
Panel	DS-0077	XF1	Fuse holder	X-1006			
		XF2	Fuse holder	X-1006			
2.0 amp, -Blo	F-0026						
0.5 amp,	F-0008						
25.0 amp, , 3 AG	F-0019						
tor	J-0003						
tor	J-0816						
tor	J-0505						
tor	483-0252						
, Test	J-0830						
tor	MP-3988						
tor	483-0201						
tor	483-0308						
tor	483-0308						
tor	483-0308						
, Relay	X-1005						
tor	J-0827						
tor	J-0823						
tor	MP-3988						
tor	MP-3988						
tor	MP-3988						
transmit/receive, volt dc	K-0069						
Converter, volt dc	K-0066						
r	483-0391						
r	483-0392						
r	483-0391						
ssembly	483-0216						
ssembly	483-0216						
ssembly	483-0216						
r, ohms at 400 Hz	LS-0006						
OWER ADJUST trol, W.W., , 5W	R-3890						
omp, ohm, 5%, 1/4W	R-1239						
E control, 30%, io Log taper with T switch	R-3888						
CH control, 30%, ear taper	R-3889						
omp, , 10%, 1/4W	R-0035						

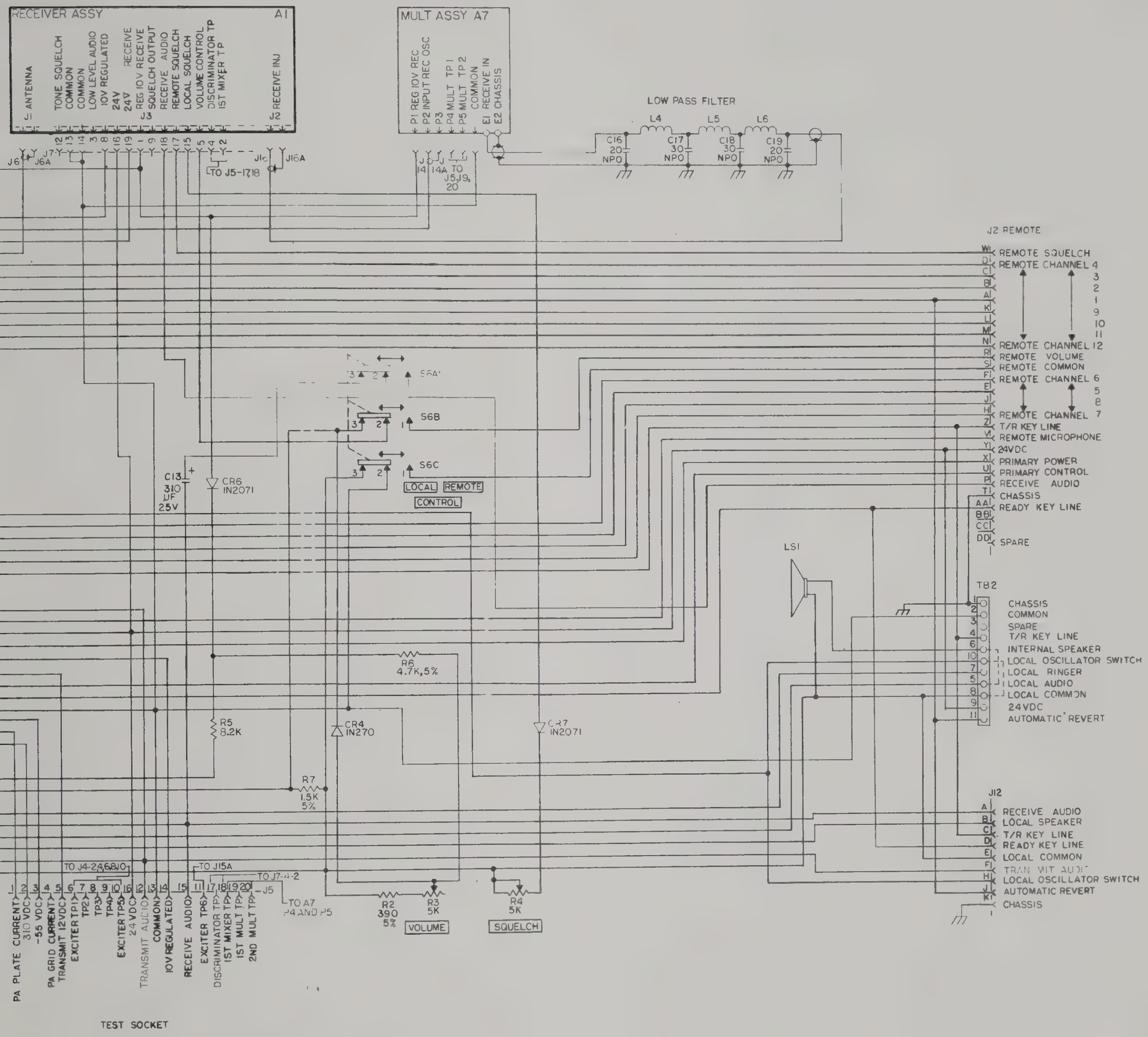


FIGURE 4. 10 - RF-404-3 MAIN FRAME SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RF-401-2 MAIN FRAME		
A1	Receiver Assembly, see separate parts list	484-0199
A2	Exciter Assembly, see separate parts list	484-0250
A3	Oscillator Unit, see separate parts list	483-0300
A4	PA Assembly, see separate parts list	483-0150
A5	Rectifier/Filter Assembly, see separate parts list	483-0360
A6	Rectifier/Filter Assembly, see separate parts list	483-0355
A7	Multiplier Assembly, see separate parts list	483-0218
A8	13.6 Volt Dc/Ac Inverter, see separate parts list	484-0410
A9	Junction Board	483-0500
C1	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C2	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C3	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C4	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C5	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C6	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C7	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C9	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C10	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C11	Cap, Cer, NPO, 8.2 pf, 5% 1 KVDCW	C-4740
C12	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C13	Cap, Alum., Elect., 580 uf, -10%, +75%, 15 VDCW	C-4924
C14	Not used	
C15	Not used	
C16	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C17	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C18	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4749
C19	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C20	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C21	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N2071	CR-0001
CR3	Diode, 1N2071	CR-0001
CR4	Diode, 1N270	CR-0047
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
DS1	Light, Transmit	DS-0073
DS2 Through DS5	Light, Panel	DS-0077
F1	Fuse, 2.0 amp, Slo-Blo	F-0026
F2	Fuse, 0.5 amp,	F-0008
F3	Fuse, 25.0 amp, 32 V, 3 AG	F-0019
J1	Connector	J-0003
J2	Connector	J-0816
J3	Connector	J-0505
J4	Connector	483-0252
J5	Socket, Test	J-0830
J6	Connector	MP-3988
J7	Connector	483-0201
J8	Connector	483-0308
J9	Connector	483-0308
J10	Connector	483-0308
J11	Socket, Relay	X-1005
J12	Connector	J-0827
J13	Connector	J-0823
J14	Connector	MP-3988
J15	Connector	MP-3988
J16	Connector	MP-3988
K1	Relay, transmit/receive, 12-volt dc	K-0069
K2	Relay, Converter, 12-volt dc	K-0066
L1	Inductor	483-0391
L2	Inductor	483-0392
L3	Inductor	483-0391
L4	Coil Assembly	483-0216
L5	Coil Assembly	483-0216
L6	Coil Assembly	483-0216
LS1	Speaker, 3.2 ohms at 400 Hz	LS-0006
R1	LOW POWER ADJUST control, W.W., 10K, 5W	R-3890
R2	Res, comp, 390 ohm, 5%, 1/4W	R-1239
R3	VOLUME control, 5K, 30%, Audio Log taper with DPST switch	R-3888
R4	SQUELCH control, 5K, 30%, Linear taper	R-3889
R5	Res, comp, 8.2K, 10%, 1/4W	R-0035
RF-401-2 MAIN FRAME		
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253
S1	Power switch, see R3	
S2	TUNE/OPERATE switch	S-0274
S3	LIGHT switch	S-0273
S4	Channel Selector switch	A483-0089
S5	SPEAKER switch	S-0273
S6	CONTROL switch	S-0272
TB1	Terminal Block, 3 terminals	TB-0473
TB2	Terminal Block, 11 terminals	TB-0507
XDS1 Through XDS5	Socket, light	X-1011
XF1	Fuse holder	X-1006
XF2	Fuse holder	X-1006

NOTES

1 ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.

2 ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED.

3 ⏚ DENOTES CHASSIS GROUND.

4 CHANNEL SELECTOR, S4, SHOWN IN POS-1, AS SEEN FROM FRONT.

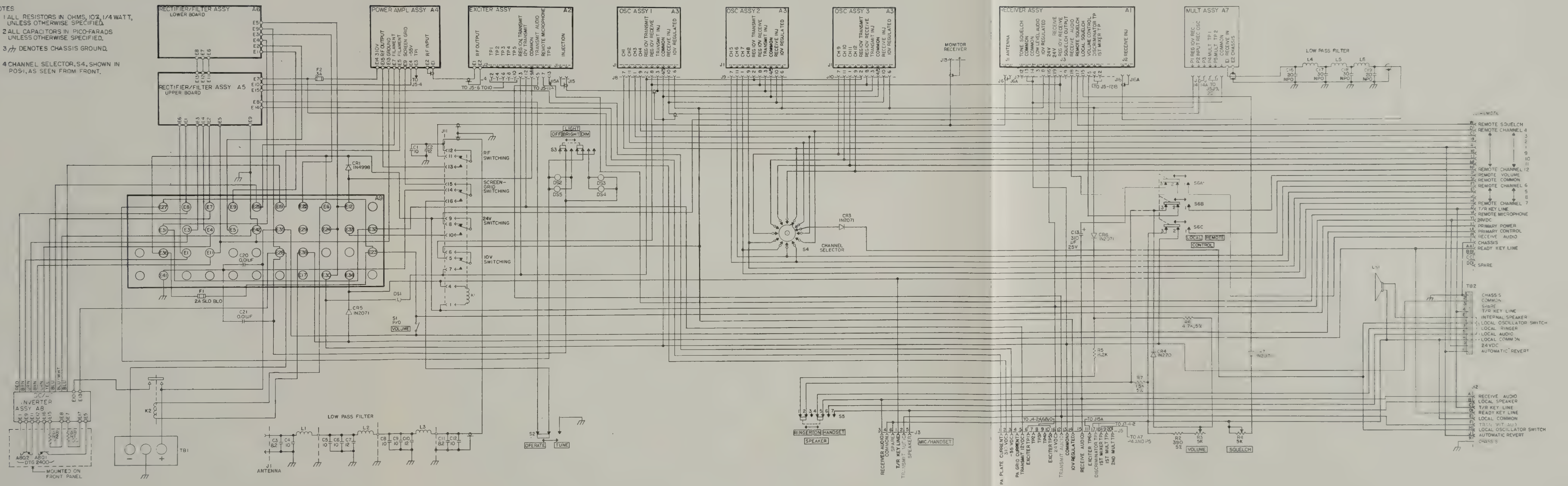
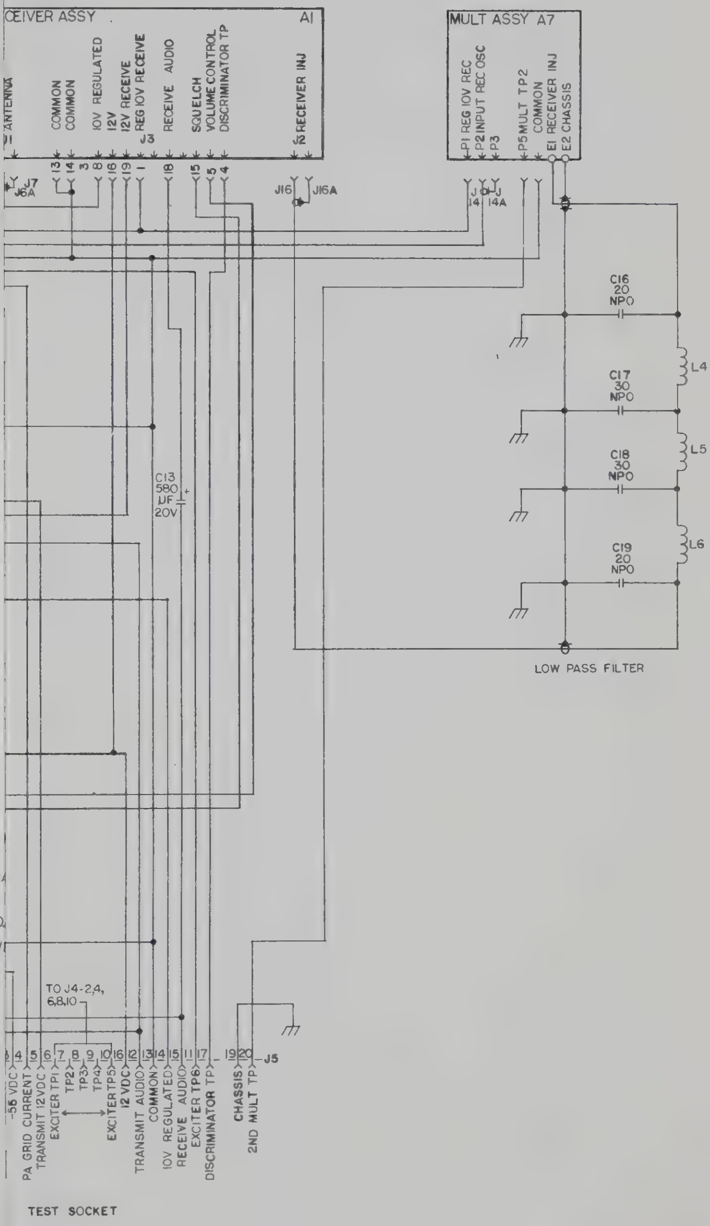


FIGURE 4.10 - RF-404-3 MAIN FRAME SCHEMATIC DIAGRAM

DESCRIPTION	RF PART NUMBER
Disc, PO, 20 pf, 5%, KVDCW	C-4745
Disc, Cer, 01 uf, +60%, -40%, 0 VDCW	C-0065
Disc, Cer, 01 uf, +60%, -40%, 0 VDCW	C-0065
, 1N4998	CR-0666
, 1N2071	CR-0001
, 1N2071	CR-0001
, 1N270	CR-0047
, 1N2071	CR-0001
, 1N2071	CR-0001
, 1N2071	CR-0001
, Transmit	DS-0074
, Panel	DS-0078
2.0 amp, -Blo	F-0026
0.3 amp,	F-0006
10.0 amp, V, 3 AG	F-0022
ctor	J-0003
ctor	J-0816
ctor	J-0505
ctor	483-0252
t, Test	J-0830
ctor	MP-3988
ctor	483-0201
ctor	483-0308
ctor	483-0308
ctor	483-0308
t, Relay	X-1005
ctor	J-0827
ctor	J-0823
ctor	MP-3988
ctor	MP-3988
ctor	MP-3988
, transmit/receive, -volt dc	K-0070
, Converter, -volt dc	K-0067
tor	483-0391
tor	483-0392
tor	483-0391
ssembly	483-0216
ssembly	483-0216
ssembly	483-0216
er, ohms at 400 Hz	LS-0007
POWER ADJUST trol, W.W., K, 5W	R-3980
comp, ohm, 5%, 1/4W	R-1239
ME control, , 30%, dio Log taper with ST switch	R-3888
LCH control, , 30%, ear taper	R-3889
comp, K, 10%, 1/4W	R-0035

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
	RF-404-3 MAIN FRAME				
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265			
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253			
S1	Power switch, see R3				
S2	TUNE/OPERATE switch	S-0274			
S3	LIGHT switch	S-0273			
S4	Channel Selector switch	A483-0089			
S5	SPEAKER switch	S-0273			
S6	CONTROL switch	S-0272			
TB1	Terminal Block, 3 terminals	TB-0473			
TB2	Terminal Block, 11 terminals	TB-0507			
XDS1 Through XDS5	Socket, light	X-1011			
XF1	Fuse holder	X-1006			
XF2	Fuse holder	X-1006			



NOTES

1 ALL RESISTORS IN OHMS, 10%,
OTHERWISE SPECIFIED.

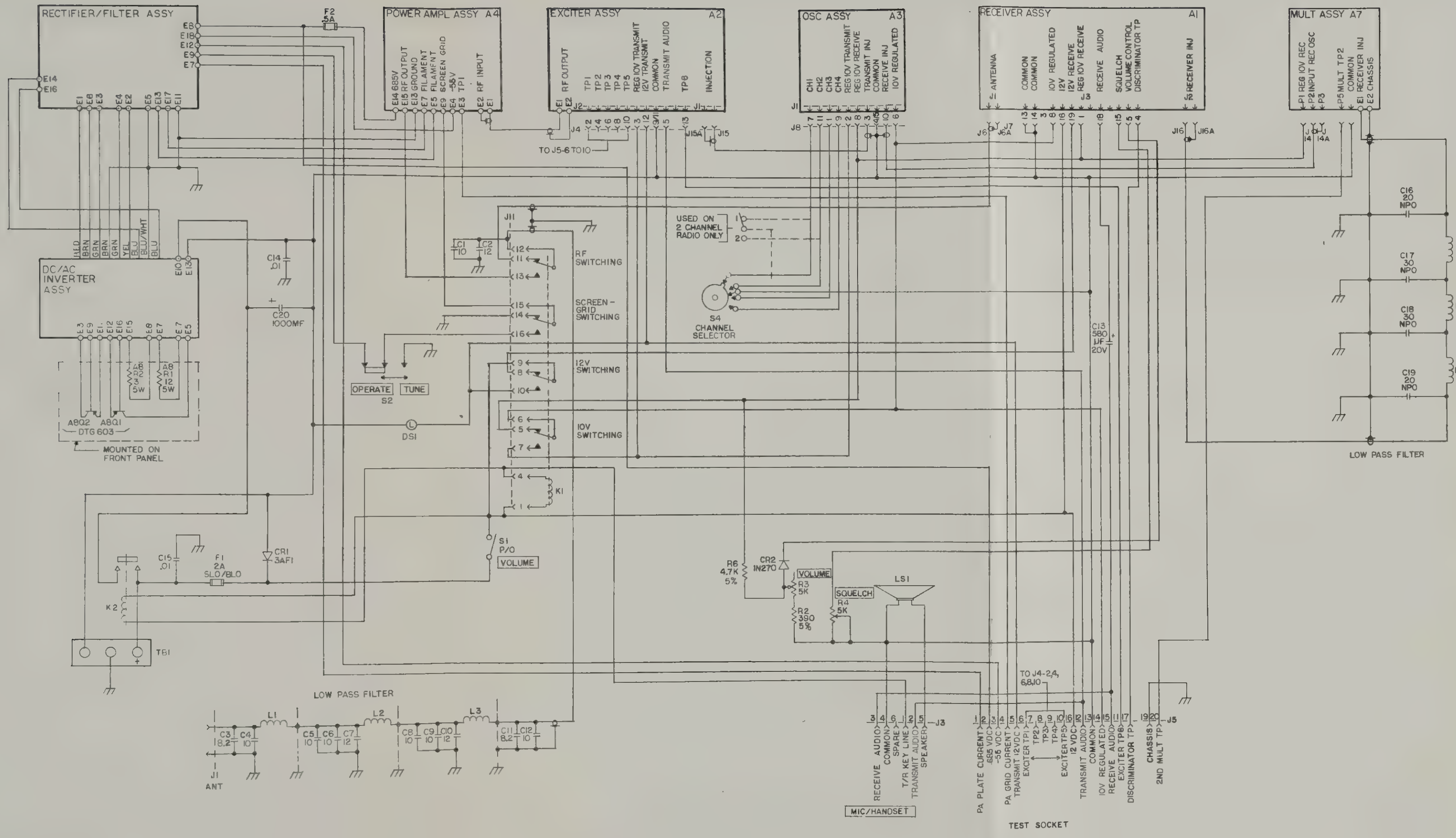
2 ALL CAPACITORS IN PICO-FAR
OTHERWISE SPECIFIED.

3 ⏚ DENOTES CHASSIS GROUND

4 CHANNEL SELECTOR, S4, SHOW
SEEN FROM FRONT.

FIGURE 4. 11 - RF-403-2 MAIN FRAME
SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RF-404-3 MAIN FRAME		
A1	Receiver Assembly, see separate parts list	484-0199
A2	Exciter Assembly, see separate parts list	484-0250
A3	Oscillator Unit, see separate parts list	483-0300
A4	PA Assembly, see separate parts list	483-0150
A5	Rectifier/Filter Assembly, see separate parts list	483-0360
A6	Rectifier/Filter Assembly, see separate parts list	483-0355
A7	Multiplier Assembly, see separate parts list	483-0218
A8	27.5 Volt Dc/Ac Inverter see separate parts list	
A9	Junction Board	483-0500
C1	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C2	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C3	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C4	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C5	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C6	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C7	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C9	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C10	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C11	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C12	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C13	Cap, Alum, Elect., 310 uf, -10%, +75%, 25 VDCW	C-4925
C14	Not used	
C15	Not used	
C16	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C17	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C18	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4749
C19	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C20	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C21	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N2071	CR-0001
CR3	Diode, 1N2071	CR-0001
CR4	Diode, 1N270	CR-0047
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
DS1	Light, Transmit	DS-0074
DS2 Through DS5	Light, Panel	DS-0078
F1	Fuse, 2.0 amp, Slo-Blo	F-0026
F2	Fuse, 0.3 amp,	F-0006
F3	Fuse, 10.0 amp, 32V, 3 AG	F-0022
J1	Connector	J-0003
J2	Connector	J-0816
J3	Connector	J-0505
J4	Connector	483-0252
J5	Socket, Test	J-0830
J6	Connector	MP-3988
J7	Connector	483-0201
J8	Connector	483-0308
J9	Connector	483-0308
J10	Connector	483-0308
J11	Socket, Relay	X-1005
J12	Connector	J-0827
J13	Connector	J-0823
J14	Connector	MP-3988
J15	Connector	MP-3988
J16	Connector	MP-3988
K1	Relay, transmit/receive, 24-volt dc	K-0070
K2	Relay, Converter, 24-volt dc	K-0067
L1	Inductor	483-0391
L2	Inductor	483-0392
L3	Inductor	483-0391
L4	Coil Assembly	483-0216
L5	Coil Assembly	483-0216
L6	Coil Assembly	483-0216
LS1	Speaker, 16 ohms at 400 Hz	LS-0007
R1	LOW POWER ADJUST control, W.W., 10K, 5W	R-3980
R2	Res, comp, 390 ohm, 5%, 1/4W	R-1239
R3	VOLUME control, 5K, 30%, Audio Log taper with DPST switch	R-3888
R4	SQUELCH control, 5K, 30%, Linear taper	R-3889
R5	Res, comp, 8.2K, 10%, 1/4W	R-0035
RF-404-3 MAIN FRAME		
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253
S1	Power switch, see R3	
S2	TUNE/OPERATE switch	S-0274
S3	LIGHT switch	S-0273
S4	Channel Selector switch	A483-0089
S5	SPEAKER switch	S-0273
S6	CONTROL switch	S-0272
TB1	Terminal Block, 3 terminals	TB-0473
TB2	Terminal Block, 11 terminals	TB-0507
XDS1 Through XDS5	Socket, light	X-1011
XF1	Fuse holder	X-1006
XF2	Fuse holder	X-1006



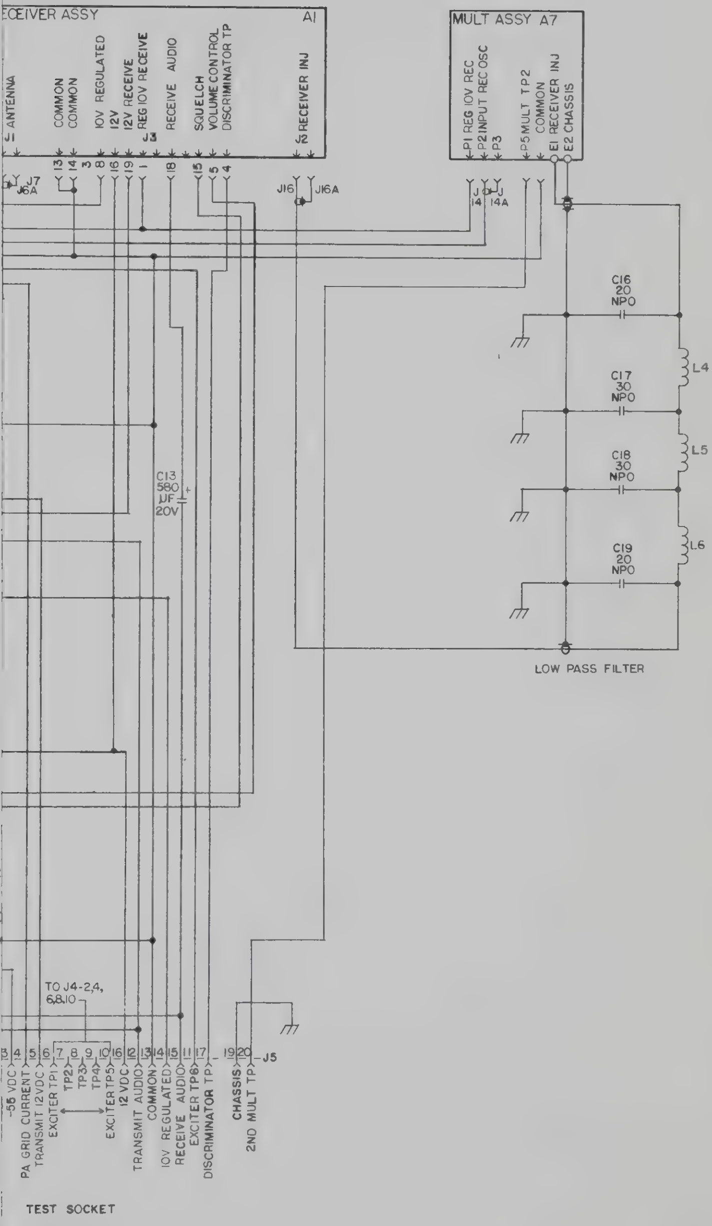
NOTES

1. ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED.
3. ⏚ DENOTES CHASSIS GROUND.
4. CHANNEL SELECTOR, S4, SHOWN IN POS-1, AS SEEN FROM FRONT.

FIGURE 4. 11 - RF-403-2 MAIN FRAME SCHEMATIC DIAGRAM

SCRIPTION	RF PART NUMBER
isc, , 20 pf, 5%, DCW	C-4745
isc, , 20 pf, 5%, DCW	C-4745
lum., Elec., uf, +50%, -10%, DCW	C-4655
3AF1	CR-0079
1N270	CR-0047
Transmit	DS-0073
.0 amp, Blo	F-0026
.5 amp	F-0008
5.0 amp, , 3 AG	F-0019
connector d	J-0003
or	J-0505
or	483-0252
Test	J-0830
or or	MP-3938
or	483-0201
d d	483-0308
Relay d d	X-1005
or	MP-3988
or	MP-3988
or	MP-3988
ransmit/receive, ic	K-0069
onverter, ic	K-0066
	483-0391
	483-0392
	483-0391
sembly	483-0216
sembly	483-0216
sembly	483-0216
, hms at 400 Hz d	LS-0006
mp, hm, 5%, 1/4W	R-1239
E control, 30%, Log Taper with switch	R-3888
H control, 30%, r taper d	R-3889
mp, , 5%, 1/4W	R-1265
mp, , 5%, 1/4W	R-1253
witch, part of R3	
PERATE switch l	S-0279
on channel selector h	A797-0059
on channel selector h	S-0050

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
	RF-403-2 MAIN FRAME				
TB1	Terminal Block, 3 terminals	TB-0433			
XDS1	Socket, light, transmit	X-1011			
XF1	Fuse holder	X-1006			
XF2	Fuse holder	X-1006			



NOTES

1 ALL RESISTORS IN OHMS, 10%,
OTHERWISE SPECIFIED.

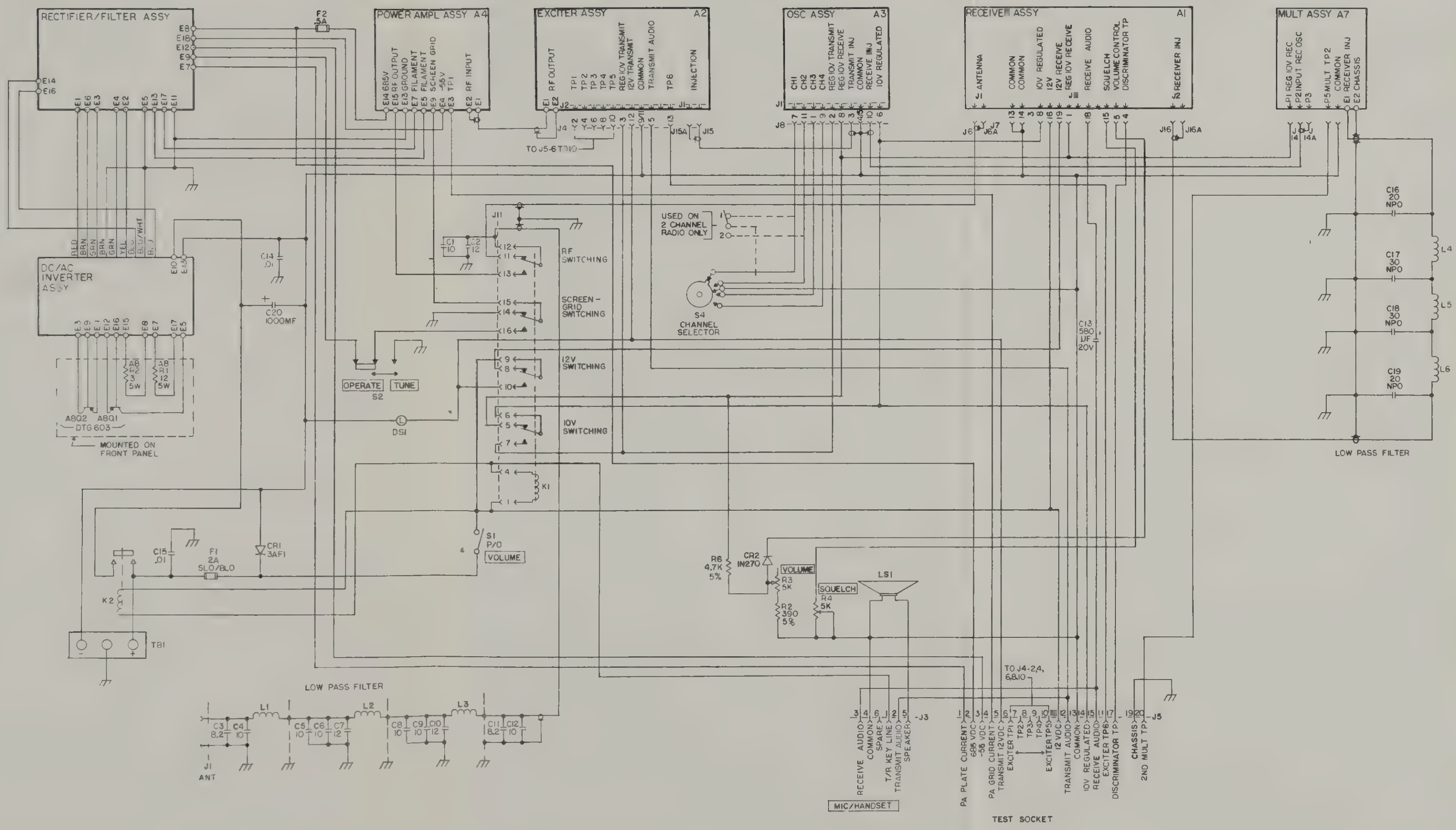
2 ALL CAPACITORS IN PICO-FAR
OTHERWISE SPECIFIED.

3 ⏚ DENOTES CHASSIS GROUND

4 CHANNEL SELECTOR, S4, SHOW
SEEN FROM FRONT.

FIGURE 4. 11 - RF-403-2 MAIN FRAME SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RF-403-2 MAIN FRAME		
A1	Receiver Assembly, see separate parts list	484-0199
A2	Exciter Assembly, see separate parts list	484-0250
A3	Oscillator Assembly, 4-channel, see separate parts list	483-0300
	Oscillator Assembly, 2-channel, see separate parts list	483-0301
A4	PA Assembly, see separate parts list	483-0150
A5	Rectifier/Filter Assembly, see separate parts list	484-0095
A6	Not used	
A7	Multiplier Assembly, see separate parts list	483-0218
A8	13.6 Volt Dc/Ac Inverter see separate parts list	484-0410
C1	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C2	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C3	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C4	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C5	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C6	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C7	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C9	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C10	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C11	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C12	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C13	Cap, Alum., Elect., 580 uf, -10%, +75%, 15 VDCW	C-4929
C14	Cap, Disc, Cer, 0.01 uf, +60%, - 40%, 150 VDCW	C-0065
C15	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C16	Cap, Disc, NPO,.20 pf, 5%, 1 KVDCW	C-4745
C17	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C18	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C19	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C20	Cap, Alum., Elec., 1000 uf, +50%, -10%, 20 VDCW	C-4655
CR1	Diode, 3AF1	CR-0079
CR2	Diode, 1N270	CR-0047
DS1	Light, Transmit	DS-0073
F1	Fuse, 2.0 amp, Slo-Blo	F-0026
F2	Fuse, 0.5 amp	F-0008
F3	Fuse, 25.0 amp, 32 V, 3 AG	F-0019
J1	Antenna connector	J-0003
J2	Not used	
J3	Connector	J-0505
J4	Connector	483-0252
J5	Socket, Test	J-0830
J6	Connector	MP-3938
J7	Connector	
J8	Connector	483-0201
J9	Not used	483-0308
J10	Not used	
J11	Socket, Relay	X-1005
J12	Not used	
J13	Not used	
J14	Connector	MP-3988
J15	Connector	MP-3988
J16	Connector	MP-3988
K1	Relay, transmit/receive, 12 vdc	K-0069
K2	Relay, converter, 12 vdc	K-0066
L1	Inductor	483-0391
L2	Inductor	483-0392
L3	Inductor	483-0391
L4	Coil Assembly	483-0216
L5	Coil Assembly	483-0216
L6	Coil Assembly	483-0216
LS1	Speaker, 3.2 ohms at 400 Hz	LS-0006
R1	Not used	
R2	Res, comp, 390 ohm, 5%, 1/4W	R-1239
R3	VOLUME control, 5K, 30%, Audio Log Taper with DPST switch	R-3888
R4	SQUELCH control, 5K, 30%, Linear taper	R-3889
R5	Not used	
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265
R7	Res, comp, 1.5K. 5%, 1/4W	R-1253
S1	Power switch, part of R3	
S2	TUNE/OPERATE switch	S-0279
S3	Not used	
S4	4-position channel selector switch	A797-0059
	2-position channel selector switch	S-0050
RF-403-2 MAIN FRAME		
TB1	Terminal Block, 3 terminals	TB-0433
XDS1	Socket, light, transmit	X-1011
XF1	Fuse holder	X-1006
XF2	Fuse holder	X-1006



NOTES
1. ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED.
3. ⏚ DENOTES CHASSIS GROUND.
4. CHANNEL SELECTOR, S4, SHOWN IN POS-1, AS SEEN FROM FRONT.

FIGURE 4.11 - RF-403-2 MAIN FRAME SCHEMATIC DIAGRAM

ESCRIPTION	RF PART NUMBER
isc,	C-4745
, 20 pf, 5%,	
VDCW	
isc,	C-4745
, 20 pf, 5%,	
VDCW	
lum., Elec.,	C-4655
uf, +50%, -10%,	
DCW	
3AF1	CR-0079
1N270	CR-0047
Transmit	DS-0073
2.0 amp,	F-0026
Blo	
.5 amp	F-0008
25.0 amp,	F-0019
, 3 AG	
connector	J-0003
ed	
tor	J-0505
tor	483-0252
Test	J-0830
tor	MP-3938
tor	
tor	483-0201
d	483-0308
d	
Relay	X-1005
d	
d	
tor	MP-3988
tor	MP-3988
tor	MP-3988
transmit/receive,	K-0069
dc	
converter,	K-0066
dc	
r	483-0391
r	483-0392
r	483-0391
sembly	483-0216
sembly	483-0216
sembly	483-0216
,	LS-0006
hms at 400 Hz	
d	
mp,	R-1239
hm, 5%, 1/4W	
E control,	R-3888
30%,	
o Log Taper with	
T switch	
CH control,	R-3889
30%,	
ar taper	
d	
mp,	R-1265
, 5%, 1/4W	
mp,	R-1253
, 5%, 1/4W	
switch, part of R3	
PERATE switch	S-0279
d	
on channel selector	A797-0059
h	
on channel selector	S-0050
h	

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
	RF-403-2 MAIN FRAME				
TB1	Terminal Block, 3 terminals	TB-0433			
XDS1	Socket, light, transmit	X-1011			
XF1	Fuse holder	X-1006			
XF2	Fuse holder	X-1006			

Stage
Q1
Q2
Q3
Q6
Q7
Q8
Q9
Q10
Q11
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22

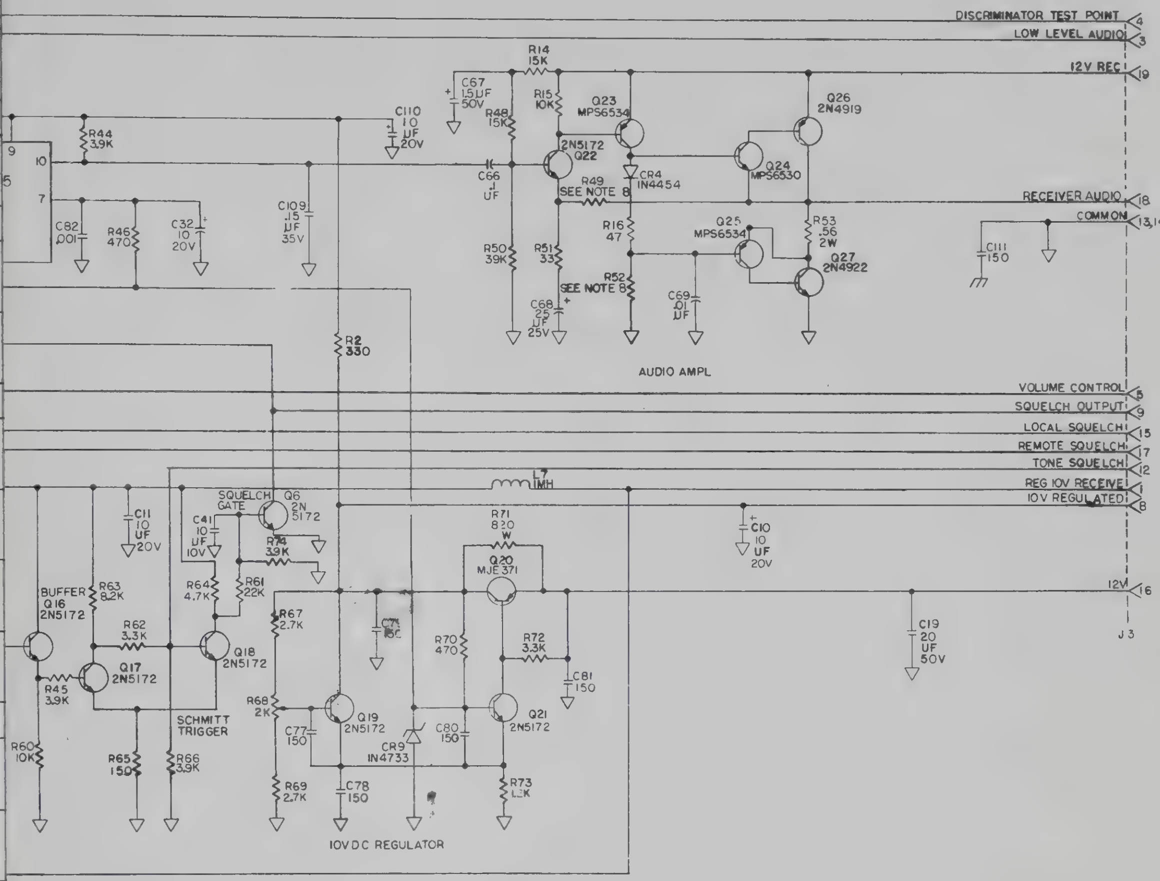
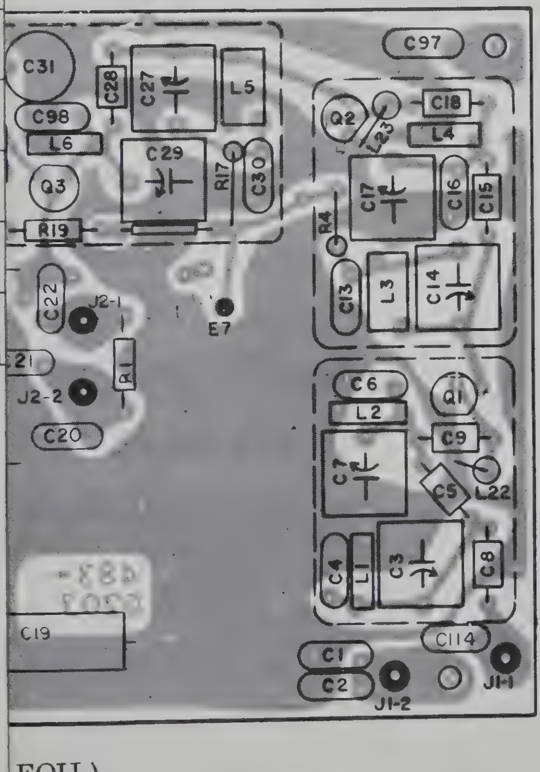


FIGURE 4. 12 - RECEIVER ASSEMBLY A1
SCHEMATIC DIAGRAM



FOIL)

REF DESIG	DESCRIPTION	RF PART NUMBER
RF-403-2 MAIN FRAME		
A1	Receiver Assembly, see separate parts list	484-0199
A2	Exciter Assembly, see separate parts list	484-0250
A3	Oscillator Assembly, 4-channel, see separate parts list	483-0300
	Oscillator Assembly, 2-channel, see separate parts list	483-0301
A4	PA Assembly, see separate parts list	483-0150
A5	Rectifier/Filter Assembly, see separate parts list	484-0095
A6	Not used	
A7	Multiplier Assembly, see separate parts list	483-0218
A8	13.6 Volt Dc/Ac Inverter see separate parts list	484-0410
C1	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C2	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C3	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C4	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C5	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C6	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C7	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C9	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C10	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C11	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C12	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C13	Cap, Alum., Elect., 580 uf, -10%, +75%, 15 VDCW	C-4929
C14	Cap, Disc, Cer, 0.01 uf, +60%, - 40%, 150 VDCW	C-0065
C15	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C16	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C17	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C18	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C19	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C20	Cap, Alum., Elec., 1000 uf, +50%, -10%, 20 VDCW	C-4655
CR1	Diode, 3AF1	CR-0079
CR2	Diode, 1N270	CR-0047
DS1	Light, Transmit	DS-0073
F1	Fuse, 2.0 amp, Slo-Blo	F-0026
F2	Fuse, 0.5 amp	F-0008
F3	Fuse, 25.0 amp, 32 V, 3 AG	F-0019
J1	Antenna connector	J-0003
J2	Not used	
J3	Connector	J-0505
J4	Connector	483-0252
J5	Socket, Test	J-0830
J6	Connector	MP-3938
J7	Connector	
J8	Connector	483-0201
J9	Not used	483-0308
J10	Not used	
J11	Socket, Relay	X-1005
J12	Not used	
J13	Not used	
J14	Connector	MP-3988
J15	Connector	MP-3988
J16	Connector	MP-3988
K1	Relay, transmit/receive, 12 vdc	K-0069
K2	Relay, converter, 12 vdc	K-0066
L1	Inductor	483-0391
L2	Inductor	483-0392
L3	Inductor	483-0391
L4	Coil Assembly	483-0216
L5	Coil Assembly	483-0216
L6	Coil Assembly	483-0216
LS1	Speaker, 3.2 ohms at 400 Hz	LS-0006
R1	Not used	
R2	Res, comp, 390 ohm, 5%, 1/4W	R-1239
R3	VOLUME control, 5K, 30%, Audio Log Taper with DPST switch	R-3888
R4	SQUELCH control, 5K, 30%, Linear taper	R-3889
R5	Not used	
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253
S1	Power switch, part of R3	
S2	TUNE/OPERATE switch	S-0279
S3	Not used	
S4	4-position channel selector switch	A797-0059
	2-position channel selector switch	S-0050
RF-403-2 MAIN FRAME		
TB1	Terminal Block, 3 terminals	TB-0433
XDS1	Socket, light, transmit	X-1011
XF1	Fuse holder	X-1006
XF2	Fuse holder	X-1006

RECEIVER BOARD A1, VOLTAGE/RESISTANCE CHART

Stage	Voltage (DC) Base	Voltage (DC) Emitter	Voltage (DC) Collector	Resistance Base	Resistance Emitter	Resistance Collector
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	0	0	+9	0 0	2Ω [illegible]	100Ω (1) 17Ω (1)
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	0	[illegible]	+9	0 [illegible]	.2Ω [illegible]	100Ω (1) [illegible]
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	[illegible]	[illegible]	[illegible]	0 0	600Ω 600Ω	600Ω 600Ω
[illegible]	+.1 to +.55	—	0 to +1.0	750Ω (2) 3.5K (2)	0 0	8.0K(2) 5K (2)
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	[illegible]	[illegible]	[illegible]	0 (1) 0 (1)	100Ω (1) 18Ω (1)	15Ω (1) 20Ω (1)
[illegible]	[illegible]	[illegible]	0	100K (2) 1K (2)	[illegible] [illegible]	[illegible] [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] [illegible]	1.2K (2) 1K (2)	[illegible] [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible] [illegible]	1.2K (2) 1K (2)	[illegible] [illegible]
	Gate	Source	Drain	Gate	Source	Drain
Q11	[illegible]	[illegible]	[illegible]	[illegible] 32K (3)	200Ω (2) 200Ω (2)	[illegible] [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.2K (2) [illegible]	460Ω (2) [illegible]	[illegible] [illegible]
[illegible]	[illegible] to +1.6	0 to [illegible]	+10	[illegible] 2.4K (2)	[illegible] [illegible]	[illegible] 90Ω (2)
Q17	0 to +.75	+.15 to +.4	[illegible] to [illegible]	1K (2) 7.0K (2)	140Ω (1) 140Ω (1)	[illegible] [illegible]
Q18	+.15 to [illegible]	+.15 to +.40	+.45 to +8.2	900 (2) [illegible]	140Ω (1) 140Ω (1)	[illegible] 2K (2)
Q19	+5	+4.4	+10	[illegible] [illegible]	[illegible] 1.2K (2)	[illegible] [illegible]
Q20	+13	+13	+10	[illegible] [illegible]	2.2K (2) [illegible]	[illegible] [illegible]
Q21	+5	+4.4	+13	2.2K (2) 1K (2)	1.4K (2) [illegible]	[illegible] [illegible]
Q22	+6.4	+6.4	[illegible]	19K (3) 40K [illegible]	[illegible] 50K [illegible]	[illegible] [illegible]

RECEIVER BOARD A1, VOLTAGE/RESISTOR CHART (Continued)

Stage	Voltage (DC) Base	Voltage (DC) Emitter	Voltage (DC) Collector	Resistance Base	Resistance Emitter	Resistance Collector
Q23	+12	+13	+6.6	44K (3) 44K (3)	38K (3) 50K (3)	2.6K (2) 3M (3)
Q24	+6.6	+6.2	+13	2.6K (2) >1M (3)	700 Ω (2) >1M (3)	∞ (3) >50K (3)
Q25	+5.6	+6.2	+.3	1K (2) 1K (2)	700 Ω (2) >40K (3)	700 Ω (2) 10M (3)
Q26	+13	+13	+6.2	∞ (3) >50K (3)	>20K (3) >40K (3)	700 Ω (2) >40K (3)
Q27	+.3	—	+6.2	700 Ω (2) 10M (3)	0 (1) 0 (1)	700 Ω (2) >40K (3)

NOTES:

1. Resistance — Negative Ground (value above the diagonal); Positive Ground (value below the diagonal)

   (1) R x 1 range
   (2) R x 100 range
   (3) R x 10,000 range

2. Measurements made with Simpson Model 260 VOM under no signal condition.

3. Measurements shown are actual readings and may vary by 15%.

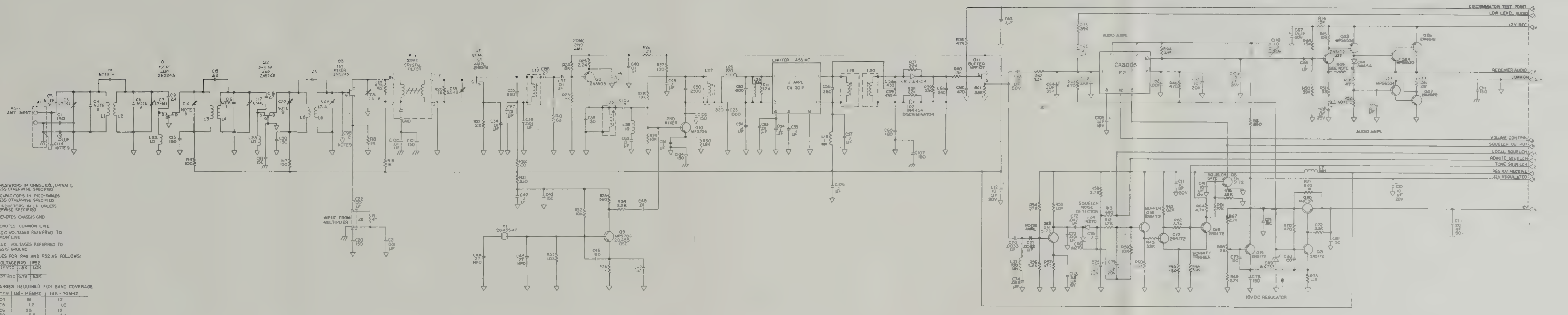
4. Resistance measurements made with board disconnected.

IC1

PIN	VOLTAGE (DC)	RESISTANCE
1	2.1	1.1K 2.4K
2	2.1	1.1K 2.4K
3	2.2	1.1K 2.4K
4	2.2	900 Ω 1.2K
5	9.8	95 Ω 22 Ω
8	0	0 0
10	9.8	100 Ω 19 Ω

IC2

PIN	VOLTAGE (DC)	RESISTANCE	PIN	VOLTAGE (DC)	RESISTANCE
1	4.8	3K 1.7K	7	4.8	3K 1.7K
2	4.2	1.4M 12K	9	10.0	2.8K 2K
3	0.6	10K 20K	10	8.2	8.5K 5K
5	.025	8K 3.5K	11	10.0	2.8K 2K
6	.075	9K 4K	12	75	12K 22K



NOTES

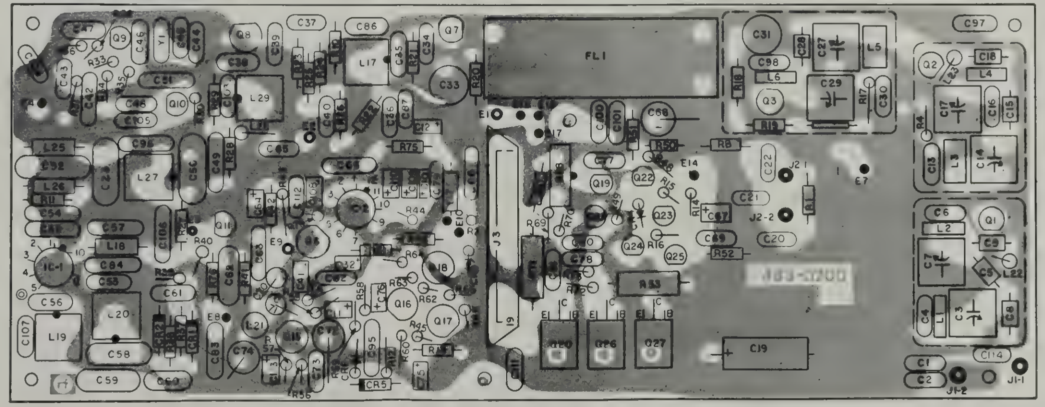
1. ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED
2. ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED
3. ALL INDUCTORS IN UH UNLESS OTHERWISE SPECIFIED
4. ⏚ DENOTES CHASSIS GND
5. ▽ DENOTES COMMON LINE
6. ALL D C VOLTAGES REFERRED TO "COMMON" LINE
7. ALL A C VOLTAGES REFERRED TO "CHASSIS" GROUND
8. VALUES FOR R49 AND R52 AS FOLLOWS:

VOLTAGE	R49	R52
12 VDC	1.5K	1.0K
27 VDC	4.7K	3.3K

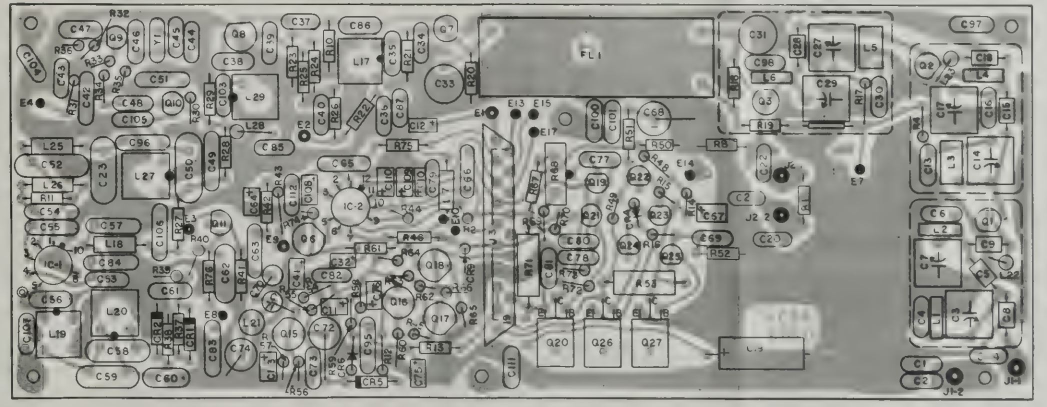
9. CHANGES REQUIRED FOR BAND COVERAGE

ITEM	132 - 148MHZ	148 - 174 MHZ
C4	18	12
C5	1.2	1.0
C6	25	12
C8	5.6	4.7
C16	15	12
C98	22	12
C114	25	20
C14	1.7 - 14	1.3 - 6.7
C27	1.7 - 14	1.3 - 6.7

FIGURE 4.12 - RECEIVER ASSEMBLY A1 SCHEMATIC DIAGRAM



RECEIVER ASSEMBLY A1 COMPONENT LOCATION (UPPER FOIL)



RECEIVER ASSEMBLY A1 COMPONENT LOCATION (LOWER FOIL)

	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
		RECEIVER ASSEMBLY A1					
V	R-0039	R57	Res, comp, 470 ohm, 10%, 1/4W	R-0020			
W	R-0025	R58	Res, comp, 2.2K, 10%, 1/4W	R-0028			
1/4W	R-0018	R59	Res, comp, 10K, 10%, 1/4W	R-0036			
V	R-0036	R60	Res, comp, 10K, 10%, 1/4W	R-0036			
1/4W	R-0021	R61	Res, comp, 22K, 10%, 1/4W	R-0040			
V	R-0028	R62	Res, comp, 3.3K, 10%, 1/4W	R-0030			
V	R-0036	R63	Res, comp, 8.2K, 10%, 1/4W	R-0035			
	R-0024	R64	Res, comp, 4.7K, 10%, 1/4W	R-0032			
V	R-0040	R65	Res, comp, 150 ohm, 10%, 1/4W	R-0014			
V	R-0040	R66	Res, comp, 3.9K, 10%, 1/4W	R-0031			
V	R-0042	R67	Res, comp, 2.7K, 10%, 1/4W	R-0029			
V	R-0039	R68	Res, Var, 2K	R-3713			
W	R-0031	R69	Res, comp, 2.7K, 10%, 1/4W	R-0029			
W	R-0030	R70	Res, comp, 470 ohm, 10%, 1/4W	R-0020			
1/4W	R-0020	R71	Res, comp, 820 ohm, 10%, 1/4W	R-0223			
W	R-0031	R72	Res, comp, 3.3K, 10%, 1/4W	R-0030			
W	R-0031	R73	Res, comp, 1.2K, 10%, 1/4W	R-0025			
1/4W	R-0020	R74	Res, comp, 3.9K, 10%, 1/4W	R-0031			
V	R-0038	R75	Res, comp, 39K, 10%, 1/4W	R-0043			
		R76	Res, comp, 47K, 10%, 1/4W	R-0044			
W	R-0026	Y1	Crystal, Frequency, 20.455 MHz	Y-0910			
			RFI shield (first rf stage)	B483-0235			
W	R-0030		RFI shield (second rf stage)	B483-0235			
W	R-0026		RFI shield (first mixer stage)	B483-0237			
V	R-0043						
/4W	R-0006						
	R-0024						
W	R-0032						
	R-0024						
2W	R-3845						
V	R-0041						
	R-0024						
W	R-0033						

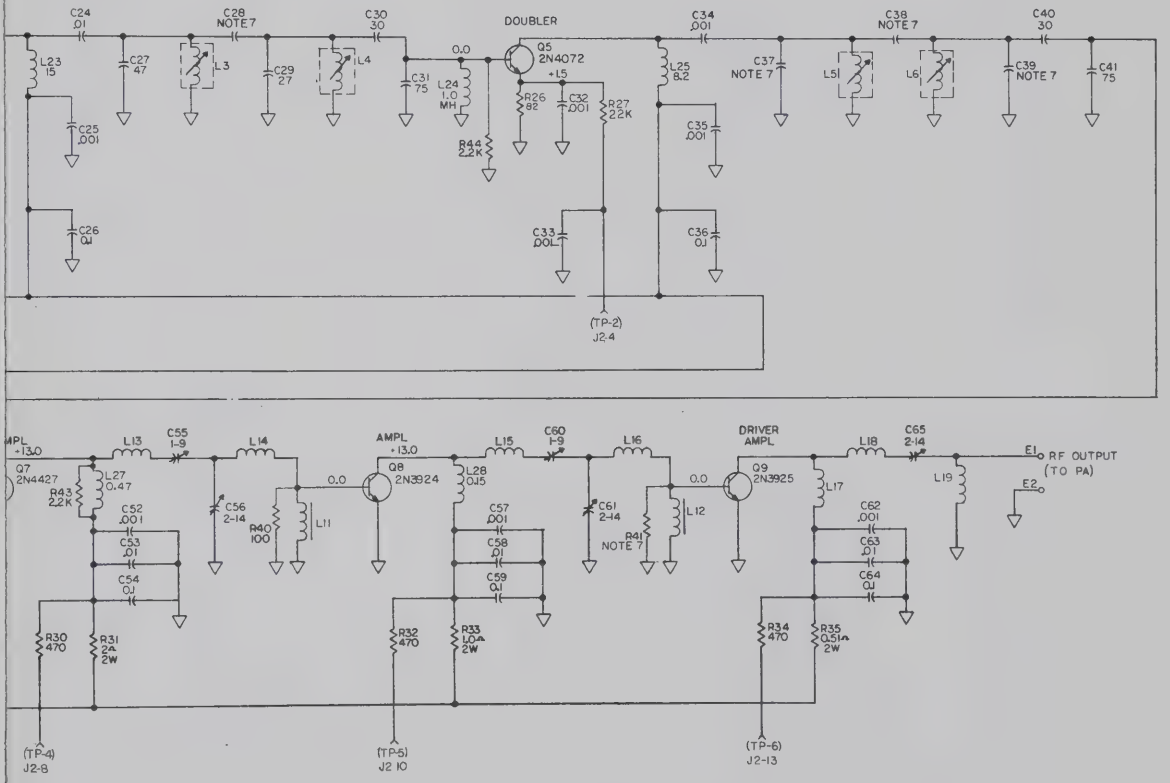


FIGURE 4. 13 - EXCITER ASSEMBLY A2
SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
	RECEIVER ASSEMBLY A1	
C1	Cap, Dis, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C2	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 15 VDCW	C-0065
C3	Cap, Var, 1.7 - 14.1 pf	C-4644
C4	132-148 MHz Cap, Disc, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C5	132-148 MHz Cap, Cer, 1.2 pf, 5%, 500 VDCW	C-4610
	148-174 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4606
C6	132-148 MHz Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C7	Cap, Var, 1.7 - 14.1 pf	C-4644
C8	132-148 MHz Cap, Cer, 5.6 pf, 5%, 500 VDCW	C-4626
	148-174 MHz Cap, Cer, 4.7 pf, 5%, 500 VDCW	C-4624
C9	Cap, Cer, 4.2 pf, 5%, 500 VDCW	C-4617
C10	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C11	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C12	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C13	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C14	Cap, Var, 1.7 - 14.1 pf	C-4644
C15	Cap, Cer, 0.68 pf, 5%, 500 VDCW	C-4604
C16	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
C16 (Cont)	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C17	Cap, Var, 1.7 - 14.1 pf	C-4644
C18	Cap, Cer, 2.7 pf, 5%, 500 VDCW	C-4618
C19	Cap, Elect, 20 uf, +150%, -10%, 50 VDCW	C-1111
C20	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C21	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C22	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C23	Cap, Mica, 1000 pf, 5%, 500 VDCW	C-0152
C24	Not used	
C25	Not used	
C26	Not used	
C27	Cap, Var, 1.7 - 14.1 pf	C-4644
C28	Cap, Cer, 0.68 pf, 5%, 500 VDCW	C-4604
C29	Cap, Var, 1.7 - 14.1 pf	C-4644
C30	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C31	Cap, Var, 5.5 - 18 pf	C-6117
C32	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C33	Cap, Var, 5.5 - 18 pf	C-6117
C34	Cap, Disc, Cer, 0.001 uf, +60%, -40%, 150 VDCW	C-0065
C35	Cap, Mica, 220 pf, 5%, 500 VDCW	C-0134
C36	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C37	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C38	Cap, Mica, 130 pf, 5%, 500 VDCW	C-0129
C39	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C40	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C41	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C42	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C43	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C44	Cap, Disc, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C45	Cap, Disc, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C46	Cap, Mica, 180 pf, 5%, 500 VDCW	C-0132
C47	Cap, Mica, 82 pf, 5%, 500 VDCW	C-0124
C48	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C49	Cap, Disc, Cer, 0.01 uf, +80%, -20%, 25 VDCW	C-2210
C50	Cap, Mica, 2500 pf, 5%, 500 VDCW	C-0162
C51	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C52	Cap, Mica, 1000 pf, 5%, 500 VDCW	C-0152
C53	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C54	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C55	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C56	Cap, Mica, 360 pf, 5%, 500 VDCW	C-0140
C57	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C58	Cap, Mica, 430 pf, 5%, 500 VDCW	C-0142
C59	Cap, Mica, 430 pf, 5%, 500 VDCW	C-0142
C60	Cap, Mica, 180 pf, 5%, 500 VDCW	C-0132
C61	Cap, Mica, 240 pf, 5%, 500 VDCW	C-0135
C62	Cap, Mica, 470 pf, 5%, 500 VDCW	C-0143
C63	Cap, Tant, 1.5 uf, 20%, 50 VDCW	C-6407
C64	Cap, Tant, 0.1 uf, 10%, 35 VDCW	C-6415
C65	Cap, Cer, 0.2 uf, +80%, -20%, 10 VDCW	C-0057
C66	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C67	Cap, Tant, 1.5 uf, 20%, 50 VDCW	C-6407
C68	Cap, Elect., 25 uf, +150%, -10%, 25 VDCW	C-1097
C69	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C70	Cap, Mylar, 0.0033 uf, 10%, 100 VDCW	C-2106
C71	Cap, Mylar, 0.0082 uf, 10%, 100 VDCW	C-2111
C72	Cap, Mylar, 0.047 uf, 20%, 100 VDCW	C-0803
C73	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C74	Cap, Tubular, Mylar, 0.033 uf, 10%, 100 VDCW	C-2118
C75	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C76	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C77	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C78	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C79	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C80	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C81	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C82	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C83	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C84	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C85	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C86	Cap, Mica, 27 pf, 5%, 500 VDCW	C-0111
C87	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C88	Not used	
C89	Not used	
C90	Not used	
C91	Not used	
C92	Not used	
C93	Not used	
C94	Not used	
C95	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C96	Cap, Mica, 330 pf, 5%,	C-0139
C97	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C98	132-148 MHz Cap, Disc, NPO, 22 pf, 5%, 1 KVDCW	C-4746
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C99	Not used	
C100	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C101	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C102	Not used	
C103	Cap, Disc, NPO, 18 pf, 5%, 1 KVDCW	C-4744
C104	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C105	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C106	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C107	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C108	Cap, Tant, 1.0 uf, 20%, 15 VDCW	C-6442
C109	Cap, Tant, 0.15 uf, 10%, 35 VDCW	C-6516
C110	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C111	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C112	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C113	Cap, Tant, 5.6 uf, 10%, 6 VDCW	C-6172
C114	132-148 MHz Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
	148 - 174 MHz Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C115	Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
CR1	Diode, 1N4454	CR-0705
CR2	Diode, 1N4454	CR-0705
CR3	Not used	
CR4	Diode, 1N4454	CR-0705
CR5	Diode, 1N270	CR-0047
CR6	Diode, 1N270	CR-0047
CR7	Not used	
CR8	Not used	
CR9	Diode, Zener, 1N4733	CR-0664
FL1	Filter, Crystal, Narrow Band	B483-0211
IC1	Integrated Circuit, Type CA-3012	IC-0002
IC2	Integrated Circuit Type CA-3005	IC-0005
L1	Inductor Assembly	483-0226
L2	Inductor Assembly	483-0226
L3	Inductor Assembly	483-0227
L4	Inductor Assembly	483-0226
L5	Inductor Assembly	483-0227
L6	Inductor Assembly	483-0226
L7	Choke, 1.0 mh, 10%	L-0050
L8	Not used	
L9	Not used	
L10	Not used	
L11	Not used	
L12	Not used	
L13	Not used	
L14	Not used	
L15	Not used	
L16	Not used	
L17	Inductor Assembly, Var	483-0230
L18	Choke, 1.0 mh, 10%	L-0050
L19	Inductor Assembly, Var	483-0231
L20	Inductor Assembly, Var	483-0232
L21	Choke, Filter, 100 mh	L-0575
L22	Choke, 1.0 uh, 10%	L-0054
L23	Choke, 1.0 uh, 10%	L-0054
L24	Not used	
L25	Choke, 220 uh, 5%	L-0067
L26	Choke, 1 mh, 10%	L-0050
L27	Inductor Assembly, Var	483-0234
L28	Choke, 10 uh, 10%	L-0057
L29	Inductor Assembly, Var	483-0233
Q1	Transistor, same as 2N5486	Q-0376
Q2	Transistor, same as 2N5486	Q-0376
Q3	Transistor, same as 2N5486	Q-0376
Q4	Not used	
Q5	Not used	
Q6	Transistor, 2N5172	Q-0027
Q7	Transistor, same as 2N5486	Q-0376
Q8	Transistor, 2N3905	Q-0356
Q9	Transistor, MPS706	Q-0017
Q10	Transistor,.MPS706	Q-0017
Q11	Transistor, same as 2N5486	Q-0376
Q12	Not used	
Q13	Not used	
Q14	Not used	
Q15	Transistor, 2N5172	Q-0027
Q16	Transistor, 2N5172	Q-0027
Q17	Transistor, 2N5172	Q-0027
Q18	Transistor, 2N5172	Q-0027
Q19	Transistor, 2N5172	Q-0027
Q20	Transistor, MJE-371	Q-0349
Q21	Transistor, 2N5172	Q-0027
Q22	Transistor, 2N5172	Q-0027
Q23	Transistor, MPS6534	Q-0329
Q24	Transistor, MPS6530	Q-0331
Q25	Transistor, MPS6534	Q-0329
Q26	Transistor, 2N4919	Q-0338
Q27	Transistor, 2N4922	Q-0335
R1	Res, comp, 47 ohm, 10%, 1/4W	R-0008
R2	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R3	Not used	
R4	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R5	Not used	
R6	Not used	
R7	Not used	
R8	Res, comp, 1K, 10%, 1/4W	R-0024
R9	Not used	
R10	Res, comp, 68 ohm, 10%, 1/4W	R-0010
R11	Res, comp, 1.2K, 10%, 1/4W	R-0025
R12	Res, comp, 1.2K, 10%, 1/4W	R-0025
R13	Res, comp, 680 ohm, 10%, 1/4W	R-0022
R14	Res, comp, 15K, 10%, 1/4W	R-0038
R15	Res, comp, 10K, 10%, 1/4W	R-0036
R16	Res, comp, 47 ohm, 10%, 1/4W	R-0008
R17	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R18	Res, comp, 3K, 5%, 1/4W	R-1264
R19	Res, comp, 1K, 10%, 1/4W	R-0024
R20	Res, comp, 1K, 10%, 1/4W	R-0024
R21	Res, comp, 22 ohm, 10%, 1/4W	R-0004
R22	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R23	Res, comp, 18K, 10%, 1/4W	R-0039
R24	Res, comp, 18K, 10%, 1/4W	R-0039
R25	Res, comp, 2.2K, 10%, 1/4W	R-0028
R26	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R27	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R28	Res, comp, 18K, 10%, 1/4W	R-0039
R29	Res, comp, 18K, 10%, 1/4W	R-0039
R30	Res, comp, 1.2K, 10%, 1/4W	R-0025
R31	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R32	Res, comp, 10K, 10%, 1/4W	R-0036
R33	Res, comp, 560 ohm, 10%, 1/4W	R-0021
R34	Res, comp, 22K, 10%, 1/4W	R-0028
R35	Res, comp, 10K, 10%, 1/4W	R-0036
R36	Res, comp, 1K, 10%, 1/4W	R-0024
R37	Res, comp, 22K, 10%, 1/4W	R-0040
R38	Res, comp, 22K, 10%, 1/4W	R-0040
R39	Res, comp, 33K, 10%, 1/4W	R-0042
R40	Res, comp, 18K, 10%, 1/4W	R-0039
R41	Res, comp, 3.9K, 10%, 1/4W	R-0031
R42	Res, comp, 3.3K, 10%, 1/4W	R-0030
R43	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R44	Res, comp, 3.9K, 10%, 1/4W	R-0031
R45	Res, comp, 3.9K, 10%, 1/4W	R-0031
R46	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R47	Not used	
R48	Res, comp, 15K, 10%, 1/4W	R-0038
R49	RF-401-2 Res, comp, 1.5K, 10%, 1/4W	R-0026
	RF-404-3 Res, comp, 3.3K, 10%, 1/4W	R-0030
	RF-403-2 Res, comp, 1.5K, 10%, 1/4W	R-0026
R50	Res, comp, 39K, 10%, 1/4W	R-0043
R51	Res, comp, 33 ohm, 10%, 1/4W	R-0006
R52	RF-401-2 Res, comp, 1K, 10%, 1/4W	R-0024
	RF-404-3 Res, comp, 4.7K, 10%, 1/4W	R-0032
	RF-403-2 Res, comp, 1K, 10%, 1/4W	R-0024
R53	Res, W.W., 0.56 ohm, 10%, 2W	R-3845
R54	Res, comp, 27K, 10%, 1/4W	R-0041
R55	Res, comp, 1K, 10%, 1/4W	R-0024
R56	Res, comp, 5.6K, 10%, 1/4W	R-0033
R57	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R58	Res, comp, 2.2K, 10%, 1/4W	R-0028
R59	Res, comp, 10K, 10%, 1/4W	R-0036
R60	Res, comp, 10K, 10%, 1/4W	R-0036
R61	Res, comp, 22K, 10%, 1/4W	R-0040
R62	Res, comp, 3.3K, 10%, 1/4W	R-0030
R63	Res, comp, 8.2K, 10%, 1/4W	R-0035
R64	Res, comp, 4.7K, 10%, 1/4W	R-0032
R65	Res, comp, 150 ohm, 10%, 1/4W	R-0014
R66	Res, comp, 3.9K, 10%, 1/4W	R-0031
R67	Res, comp, 2.7K, 10%, 1/4W	R-0029
R68	Res, Var, 2K	R-3713
R69	Res, comp, 2.7K, 10%, 1/4W	R-0029
R70	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R71	Res, comp, 820 ohm, 10%, 1/4W	R-0223
R72	Res, comp, 3.3K, 10%, 1/4W	R-0030
R73	Res, comp, 1.2K, 10%, 1/4W	R-0025
R74	Res, comp, 3.9K, 10%, 1/4W	R-0031
R75	Res, comp, 39K, 10%, 1/4W	R-0043
R76	Res, comp, 47K, 10%, 1/4W	R-0044
Y1	Crystal, Frequency, 20.455 MHz	Y-0910
	RFI shield (first rf stage)	B483-0235
	RFI shield (second rf stage)	B483-0235
	RFI shield (first mixer stage)	B483-0237

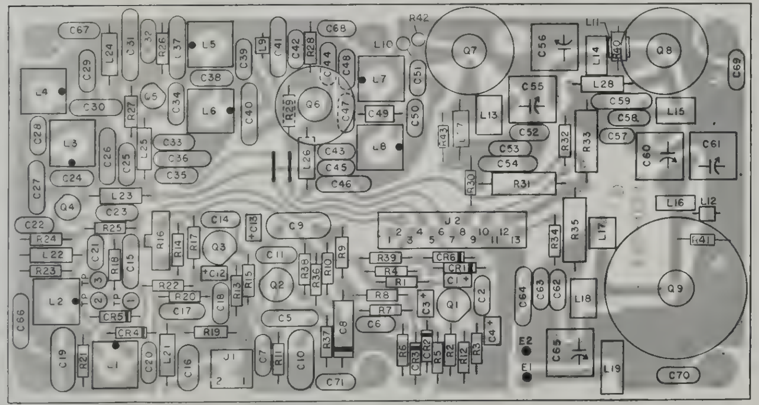
EXCITER BOARD A2, VOLTAGE/RESISTANCE CHART

Stage	Voltage (DC)			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
Q1	+2.4	1.8	+9.0	900Ω (2) 750Ω (2)	500Ω (2) 500Ω (2)	1.5K (2) 1.5K (2)
Q2	5.4 (Note 1)	+5.0	+9.0	10K (2) 70K (2)	10K (2) 9K (2)	8K (2) 8K (2)
Q3	0.1	0.7	+6.0	K (2) 15K (2)	1.6K (2) 2K (2)	10K (2) 9K (2)
Q4	[illegible]	2.	+1 .0	14Ω (1) 14Ω (1)	200Ω (2) 200Ω (2)	20M (3) 700Ω (2)
Q5	0	+2.	1 .0	11Ω (1) 14Ω (1)	90Ω (2) 90Ω (2)	20M (3) 650 (2)
Q6	[illegible]	5.2	1 0	0 (1) 1 (1)	17Ω (1) 100Ω (1)	20M (3) 650Ω (2)
Q7	0	—	+1 0	4Ω (1) 4Ω (1)	0 (1) 0 (1)	20M (3) 700Ω (2)
Q8	0	—	+13.0	0 (1) 0 (1)	0 (1) 0 (1)	20M (3) 700Ω (2)
Q9	0	—	+13.0	0 (1) 0 (1)	0 (1) 0 (1)	20M (3) 700Ω (2)

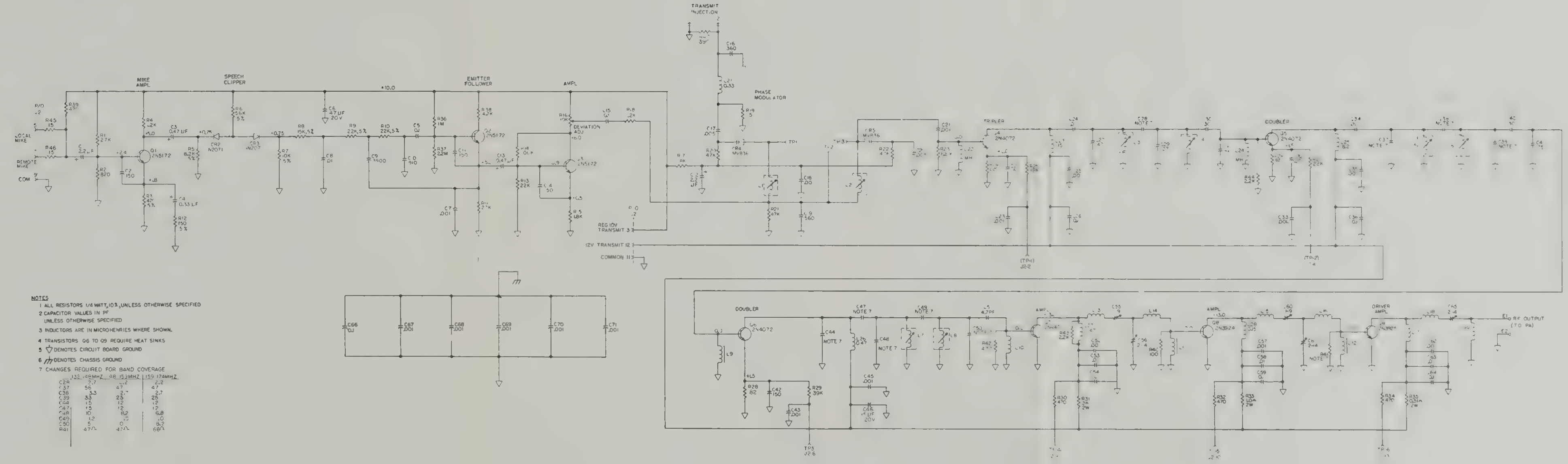
NOTES

1. Use 11-megohm VTVM at this point.
2. Resistance
   (1) R x 1 range
   (2) R x 100 range
   (3) R x 10,000 range
3. Measurements made with Simpson Model 260 VOM under no signal condition.
4. Measurements shown are actual readings and may vary by 15%.
5. Resistance measurements made with board disconnected.

Negative Ground — Positive Ground



EXCITER ASSEMBLY A2, COMPONENT LOCATION



NOTES

1. ALL RESISTORS 1/4 WATT, 10%, UNLESS OTHERWISE SPECIFIED
2. CAPACITOR VALUES IN PF UNLESS OTHERWISE SPECIFIED
3. INDUCTORS ARE IN MICROHENRIES WHERE SHOWN.
4. TRANSISTORS Q6 TO Q9 REQUIRE HEAT SINKS
5. ▽ DENOTES CIRCUIT BOARD GROUND
6. ⏚ DENOTES CHASSIS GROUND
7. CHANGES REQUIRED FOR BAND COVERAGE

	132-148MHZ	148-153MHZ	159-174MHZ
C28	2.7	2.2	2.2
C37	56	47	47
C38	3.3	2.7	2.7
C39	33	25	25
C44	15	12	12
C47	15	12	12
C48	10	8.2	6.8
C49	1.2	1.0	1.0
C50	5	0	8.2
R41	47Ω	47Ω	68Ω

FIGURE 4.13 - EXCITER ASSEMBLY A2
SCHEMATIC DIAGRAM

ESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
			EXCITER ASSEMBLY A2				
comp, 7K, 5%, 1/4W	R-0041	R43	Res, comp, 2.2K, 10%, 1/4W	R-0028			
comp, 50 ohm, 5%, 1/4W	R-1229	R44	Res, comp, 2.2K, 10%, 1/4W	R-0028			
comp, 2K, 10%, 1/4W	R-0040	R45	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002			
comp, 00K, 10%, 1/4W	R-0048						
comp, .8K, 10%, 1/4W	R-0027	R46	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002			
Var., 0K	R-3715	R47	Res, comp, 390 ohm, 10%, 1/4W	R-0019			
comp, 3K, 10%, 1/4W	R-0039		Heat sink for Q6	X-1007			
comp, .2K, 10%, 1/4W	R-0025		Heat sink for Q7	X-1008			
comp, 5 ohm, 10%, 1/4W	R-0002		Heat sink for Q8	X-1008			
comp, 7K, 10%, 1/4W	R-0044		Heat sink for Q9	B484-0192			
comp, 7K, 10%, 1/4W	R-0044						
comp, 7K, 10%, 1/4W	R-0044						
comp, 8K, 10%, 1/4W	R-0034						
comp, 20 ohm, 10%, 1/4W	R-0016						
comp, 3K, 10%, 1/4W	R-0039						
comp, 2 ohm, 10%, 1/4W	R-0011						
comp, 2K, 10%, 1/4W	R-0040						
comp, 2 ohm, 10%, 1/4W	R-0011						
comp, 0K, 10%, 1/4W	R-0043						
comp, 70 ohm, 10%, 1/4W	R-0020						
W.W., ohm, 2W	R-3914						
comp, 70 ohm, 10%, 1/4W	R-0020						
W.W., ohm, 2W	R-3907						
comp, 70 ohm, 10%, 1/4W	R-0020						
W.W., 51 ohm, 2W	R-3900						
comp, meg, 10%, 1/4W	R-0060						
comp, 2 meg, 10%, 1/4W	R-0064						
comp, 7K, 10%, 1/4W	R-0032						
comp, 0 ohm, 10%, 1/4W	R-0020						
comp, 0 ohm, 10%, 1/4W 158 MHz	R-0012						
comp, ohm, 10%, 1/4W 174 MHz	R-0008						
comp, ohm, 10%, 1/4W	R-0010						
comp, 0 ohm, 10%, 1/4W	R-0020						

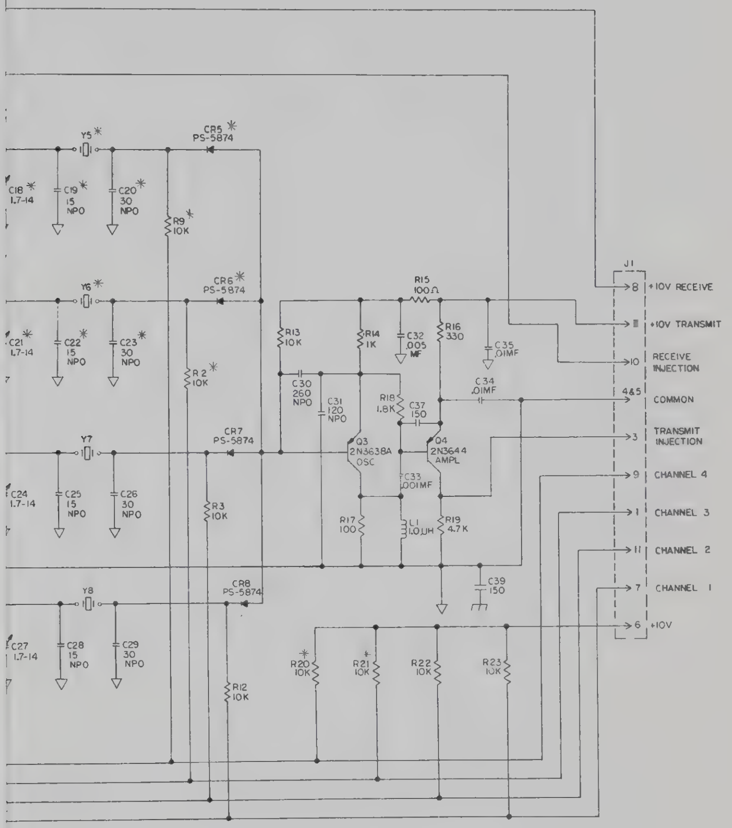


FIGURE 4. 14 - OSCILLATOR ASSEMBLY A3
SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
EXCITER ASSEMBLY A2		
C1	Cap, Tant, 2.2 uf, 20%, 20 VDCW	C-6444
C2	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C3	Cap, Tant, 0.47 uf, 20%, 35 VDCW	C-6419
C4	Cap, Tant, 0.33 uf, 10%, 35 VDCW	C-6518
C5	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C6	Cap, Tant, 47 uf, 20%, 20 VDCW	C-6452
C7	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C8	Cap, Tubular, Mylar, 0.01 uf, 10%, 100 VDCW	C-2112
C9	Cap, DM, 3900 pf, 5%, 500 VDCW	C-0167
C10	Cap, DM, 910 pf, 5%, 500 VDCW	C-0151
C11	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C12	Cap, Tant, 2.2 uf, 20%, 20 VDCW	C-6444
C13	Cap, Tant, 0.47 uf, 20%, 35 VDCW	C-6419
C14	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C15	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C16	Cap, DM, 360 pf, 5%, 500 VDCW	C-0140
C17	Cap, Disc, Cer, 0.005 uf, +60%, -40%, 150 VDCW	C-0064
C18	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C19	Cap, DM, 560 pf, 5%, 500 VDCW	C-0146
C20	Cap, Disc, Cer, 0.005 uf, +60%, -40%, 150 VDCW	C-0064
C21	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C22	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C23	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C24	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C25	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C26	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C27	Cap, Disc, NPO, 47 pf, 5%, 1 KVDCW	C-4752
C28	132-148 MHz Cap, Disc, NPO, 2.7 pf, ±0.5 pf, 1 KVDCW	C-4732
	148-174 MHz Cap, Disc, NPO, 2.2 pf, ±0.5 pf, 1 KVDCW	C-4731
C29	Cap, Disc, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C30	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C31	Cap, Disc, NPO, 75 pf, 5%, 1 KVDCW	C-4756
C32	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C33	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C34	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C35	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C36	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C37	132-148 MHz Cap, Disc, NPO, 56 pf, 5%, 1 KVDCW	C-4754
	148-174 MHz Cap, Disc, NPO, 47 pf, 5%, 1 KVDCW	C-4752
C38	132-148 MHz Cap, Disc, NPO, 3.3 pf, ±0.5 pf, 1 KVDCW	C-4734
	148-174 MHz Cap, Disc, NPO, 2.7 pf, ±0.5 pf, 1 KVDCW	C-4732
C39	132-148 MHz Cap, Disc, NPO, 33 pf, 5%, 1 KVDCW	C-4750
C39 (Cont)	148-174 MHz Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
C40	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C41	Cap, Disc, NPO, 75 pf, 5%, 1 KVDCW	C-4756
C42	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C43	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C44	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C45	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C46	Cap, Tant, 15 uf, 20%, 20 VDCW	C-6449
C47	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C48	132-148 MHz Cap, Disc, NPO, 10 pf, 5%, 1 KVDCW	C-4741
	148-158 MHz Cap, Disc, NPO, 8.2 pf, ±0.5 pf, 1 KVDCW	C-4740
	158-174 MHz Cap, Disc, NPO, 6.8 pf, ±0.5 pf, 1 KVDCW	C-4739
C49	132-148 MHz Cap, Cer, 1.2 pf, 5%, 500 VDCW	C-4610
	148-174 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4608
C50	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	148-158 MHz Cap, Disc, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C50 (Cont)	158-174 MHz Cap, Disc, NPO, 8.2 pf, ±0.5%, 1 KVDCW	C-4740
C51	Cap, Disc, Cer, NPO, 4.7 pf, 5%, 1 KVDCW	C-4736
C52	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C53	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C54	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C55	Cap, Air Var., 1.4-9.2 pf	C-4642
C56	Cap, Air Var., 1.7-14.1 pf	C-4644
C57	Cap, Disc, Cer, 0.001 uf, GMV 500 VDCW	C-0001
C58	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C59	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C60	Cap, Air Var., 1.4-9.2 pf	C-4642
C61	Cap, Air Var., 1.7-14.1 pf	C-4644
C62	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C63	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C64	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C65	Cap, Air Var., 1.7-14.1 pf	C-4644
C66	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C67	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C68	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C69	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C70	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C71	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
CR1	RF-401-2, RF-404-3 only Diode, 1N2071	CR-0001
CR2	Diode, 1N2071	CR-0001
CR3	Diode, 1N2071	CR-0001
CR4	Diode, VVC, MV836	CR-0667
CR5	Diode, VVC, MV836	CR-0667
CR6	RF-401-2, RF-404-3 only Diode, 1N2071	CR-0001
L1	Coil Assembly, Var	483-0260
L2	Coil Assembly, Var	483-0260
L3	Coil Assembly, Var	483-0261
L4	Coil Assembly, Var	483-0261
L5	Coil Assembly, Var	483-0262
L6	Coil Assembly, Var	483-0262
L7	Coil Assembly, Var	483-0263
L8	Coil Assembly, Var	483-0263
L9	Coil Assembly	483-0269
L10	Coil, 100 uh	L-0051
L11	Coil Assembly	483-0269
L12	Coil Assembly	483-0269
L13	Coil Assembly	483-0265
L14	132-148 MHz Coil Assembly	483-0266
	148-174 MHz Coil Assembly	483-0264
L15	Coil Assembly	483-0266
L16	Coil Assembly	483-0264
L17	Coil Assembly	483-0267
L18	132-148 MHz Coil Assembly	483-0275
	148-174 MHz Coil Assembly	483-0265
L19	Coil Assembly	483-0268
L20	Not used	
L21	Coil, 0.33 uh	L-0035
L22	Coil, 1.0 mh	L-0050
L23	Coil, 15 uh	L-0084
L24	Coil, 1.0 mh	L-0050
L25	Coil, 8.2 uh	L-0082
L26	Coil, 0.47 uh	L-0028
L27	Coil, 0.47 uh	L-0028
L28	Coil, 0.15 uh	L-0074
Q1	Transistor, 2N5172	Q-0027
Q2	Transistor, 2N5172	Q-0027
Q3	Transistor, 2N5172	Q-0027
Q4	Transistor, 2N4072	Q-0033
Q5	Transistor, 2N4072	Q-0033
Q6	Transistor, 2N4072	Q-0033
Q7	Transistor, 2N4427	Q-0343
Q8	Transistor, 2N3924	Q-0345
Q9	Transistor, 2N3925	Q-0031
R1	Res, Comp, 2.7K, 10%, 1/4W	R-0029
R2	Res, comp, 820 ohm, 10%, 1/4W	R-0023
R3	Res, comp, 470 ohm, 5%, 1/4W	R-1241
R4	Res, comp, 8.2K, 5%, 1/4W	R-1271
R5	Res, comp, 8.2K, 5%, 1/4W	R-1271
R6	Res, comp, 56K, 5%, 1/4W	R-1291
R7	Res, comp, 10K, 5%, 1/4W	R-1273
R8	Res, comp, 15K, 5%, 1/4W	R-1277
R9	Res, comp, 22K, 5%, 1/4W	R-1281
R10	Res, comp, 22K, 5%, 1/4W	R-1281
R11	Res, comp, 27K, 5%, 1/4W	R-0041
R12	Res, comp, 150 ohm, 5%, 1/4W	R-1229
R13	Res, comp, 22K, 10%, 1/4W	R-0040
R14	Res, comp, 100K, 10%, 1/4W	R-0048
R15	Res, comp, 1.8K, 10%, 1/4W	R-0027
R16	Res, Var., 10K	R-3715
R17	Res, comp, 18K, 10%, 1/4W	R-0039
R18	Res, comp, 1.2K, 10%, 1/4W	R-0025
R19	Res, comp, 15 ohm, 10%, 1/4W	R-0002
R20	Res, comp, 47K, 10%, 1/4W	R-0044
R21	Res, comp, 47K, 10%, 1/4W	R-0044
R22	Res, comp, 47K, 10%, 1/4W	R-0044
R23	Res, comp, 6.8K, 10%, 1/4W	R-0034
R24	Res, comp, 220 ohm, 10%, 1/4W	R-0016
R25	Res, comp, 18K, 10%, 1/4W	R-0039
R26	Res, comp, 82 ohm, 10%, 1/4W	R-0011
R27	Res, comp, 22K, 10%, 1/4W	R-0040
R28	Res, comp, 82 ohm, 10%, 1/4W	R-0011
R29	Res, comp, 39K, 10%, 1/4W	R-0043
R30	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R31	Res, W.W., 2 ohm, 2W	R-3914
R32	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R33	Res, W.W., 1 ohm, 2W	R-3907
R34	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R35	Res, W.W., 0.51 ohm, 2W	R-3900
R36	Res, comp, 1 meg, 10%, 1/4W	R-0060
R37	Res, comp, 2.2 meg, 10%, 1/4W	R-0064
R38	Res, comp, 4.7K, 10%, 1/4W	R-0032
R39	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R40	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R41	132-158 MHz Res, comp, 47 ohm, 10%, 1/4W	R-0008
	158-174 MHz Res, comp, 68 ohm, 10%, 1/4W	R-0010
R42	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R43	Res, comp, 2.2K, 10%, 1/4W	R-0028
R44	Res, comp, 2.2K, 10%, 1/4W	R-0028
R45	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002
R46	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002
R47	Res, comp, 390 ohm, 10%, 1/4W	R-0019
	Heat sink for Q6	X-1007
	Heat sink for Q7	X-1008
	Heat sink for Q8	X-1008
	Heat sink for Q9	B484-0192

OSCILLATOR BOARD A3, VOLTAGE/RESISTANCE CHART

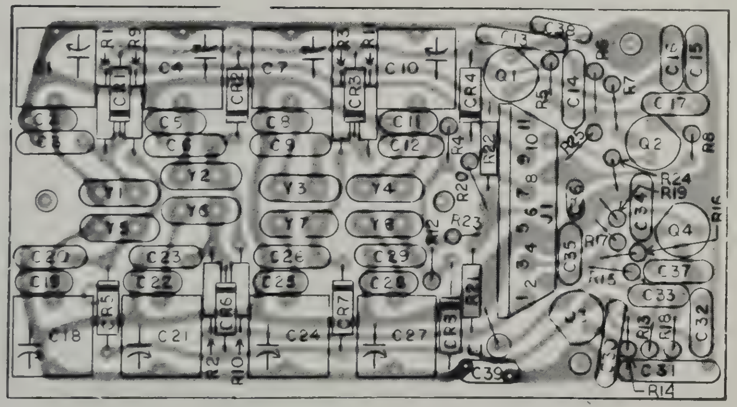
Stage	Voltage (DC)			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
Q1	-6.0	-6.8	0	∞(3) 1K (2)	∞(3) 2.6K (2)	0 (1) 0 (1)
Q2	-6.8	-7.3	0	∞(3) 3K (2)	∞(3) 3K (2)	5K (2) 5K (2)
Q3	-6.2	-6.8	0	∞ (2) 1.1K (2)	∞(3) 3K (2)	1Ω (1) 1Ω (1)
Q4	-6.8	+7.2	0	∞(3) 5K (2)	∞(3) 3.5K (2)	5K (2) 5K (2)

NOTES:

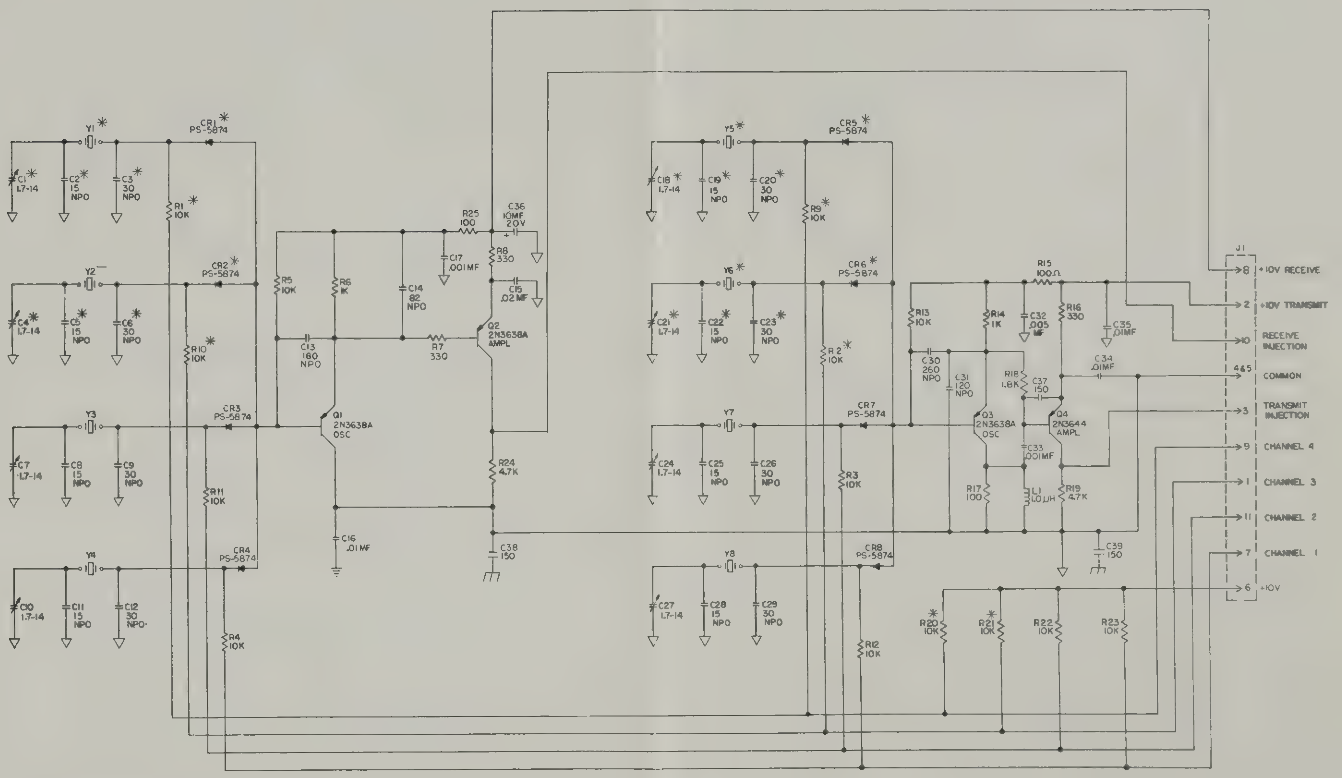
1. Resistance

   (1) R x 1 range
   (2) R x 100 range
   (3) R x 10,000 range

2. Measurements made with Simpson Model 260 VOM, under no signal condition.
3. Measurements shown are actual readings and may vary by 15%.
4. Resistance measurements made with board disconnected.



OSCILLATOR ASSEMBLY A3
COMPONENT LOCATION

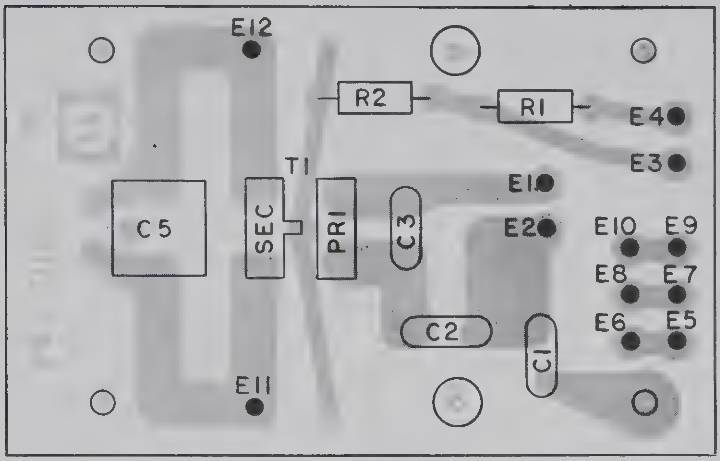


NOTES:
1.ALL RESISTORS 1/4W, 10% UNLESS OTHERWISE SPECIFIED
2.ALL CAPACITORS IN PICO FARADS UNLESS OTHERWISE SPECIFIED
3 CONNECTIONS TO "COMMON" ARE SHOWN ⏚
4 CONNECTIONS TO "CHASSIS" ARE SHOWN ⏚
5 ASTERISK(*) INDICATES COMPONENTS NOT USED IN TWO CHANNEL SETS.

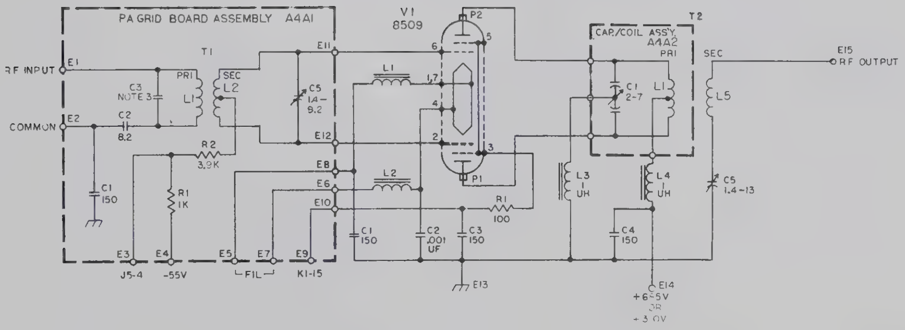
FIGURE 4.14 - OSCILLATOR ASSEMBLY A3
SCHEMATIC DIAGRAM

SCRIPTION	RF PART NUMBER
nel oscillator only isc,), 15 pf, 5%, VDCW	C-4743
nel oscillator only isc,), 30 pf, 5%, VDCW	C-4855
ar, -14 pf	C-4644
isc,), 15 pf, 5%, VDCW	C-4743
isc,), 30 pf, 5%, VDCW	C-4855
ar, -14 pf	C-4644
isc,), 15 pf, 5%, VDCW	C-4743
isc,), 30 pf, 5%, VDCW	C-4855
isc,), 260 pf, 5%, VDCW	C-4586
isc,), 120 pf, 5%, VDCW	C-4234
er,)5 uf, +80%, -20%, VDCW	C-2220
isc,)1 uf, GMV, VDCW	C-0001
er, . uf, +60%, -40%, VDCW	C-0065
er, . uf, +60%, -40%, VDCW	C-0065
ant, f, 20%, DCW	C-6448
er, pf, 20%, DCW	C-4794
er, pf, 20%, DCW	C-4794
er, pf, 20%, DCW	C-4794
nel oscillator only PS-5874	CR-0662
nel oscillator only PS-5874	CR-0662
PS-5874	CR-0662
PS-5874	CR-0662
nel oscillator only PS-5874	CR-0662
nel oscillator only PS-5874	CR-0662
PS-5874	CR-0662
PS-5874	CR-0662
r, 1.0 uh	L-0054

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
OSCILLATOR ASSEMBLY A3					
Q1	Transistor, 2N3638A	Q-0319	Y3	Crystal, Receive (specify frequency)	Y-0911
Q2	Transistor, 2N3644	Q-0315	Y4	Crystal, Receive (specify frequency)	Y-0911
Q3	Transistor, 2N3638A	Q-0319	Y5	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
Q4	Transistor, 2N3644	Q-0315	Y6	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
R1	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032	Y7	Crystal, Transmit (specify frequency)	Y-0912
R2	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032	Y8	Crystal, Transmit (specify frequency)	Y-0912
R3	Res, comp, 4.7K, 10%, 1/4W	R-0032		Crystal clamp	B483-0306
R4	Res, comp, 4.7K, 10%, 1/4W	R-0032		Crystal clamp gasket	B483-0307
R5	Res, comp, 4.7K, 10%, 1/4W	R-0032			
R6	Res, comp, 1K, 10%, 1/4W	R-0024			
R7	Res, comp, 330 ohm, 10%, 1/4W	R-0018			
R8	Res, comp, 330 ohm, 10%, 1/4W	R-0018			
R9	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032			
R10	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032			
R11	Res, comp, 4.7K, 10%, 1/4W	R-0032			
R12	Res, comp, 4.7K, 10%, 1/4W	R-0032			
R13	Res, comp, 4.7K, 10%, 1/4W	R-0032			
R14	Res, comp, 1K, 10%, 1/4W	R-0024			
R15	Res, comp, 100 ohm, 10%, 1/4W	R-0012			
R16	Res, comp, 330 ohm, 10%, 1/4W	R-0018			
R17	Res, comp, 100 ohm, 10%, 1/4W	R-0012			
R18	Res, 1.8K, 10%, 1/4W	R-0027			
R19	Res, 4.7K, 10%, 1/4W	R-0032			
R20	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036			
R21	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036			
R22	Res, 10K, 10%, 1/4W	R-0036			
R23	Res, 10K, 10%, 1/4W	R-0036			
R24	Res, 4.7K, 10%, 1/4W	R-0032			
R25	Res, comp, 100 ohm, 10%, 1/4W	R-0012			
Y1	4-channel oscillator only Crystal, Receive, (specify frequency)	Y-0911			
Y2	4-channel oscillator only Crystal, Receive (specify frequency)	Y-0911			



PA GRID BOARD ASSEMBLY
A4A1 COMPONENT LOCATION



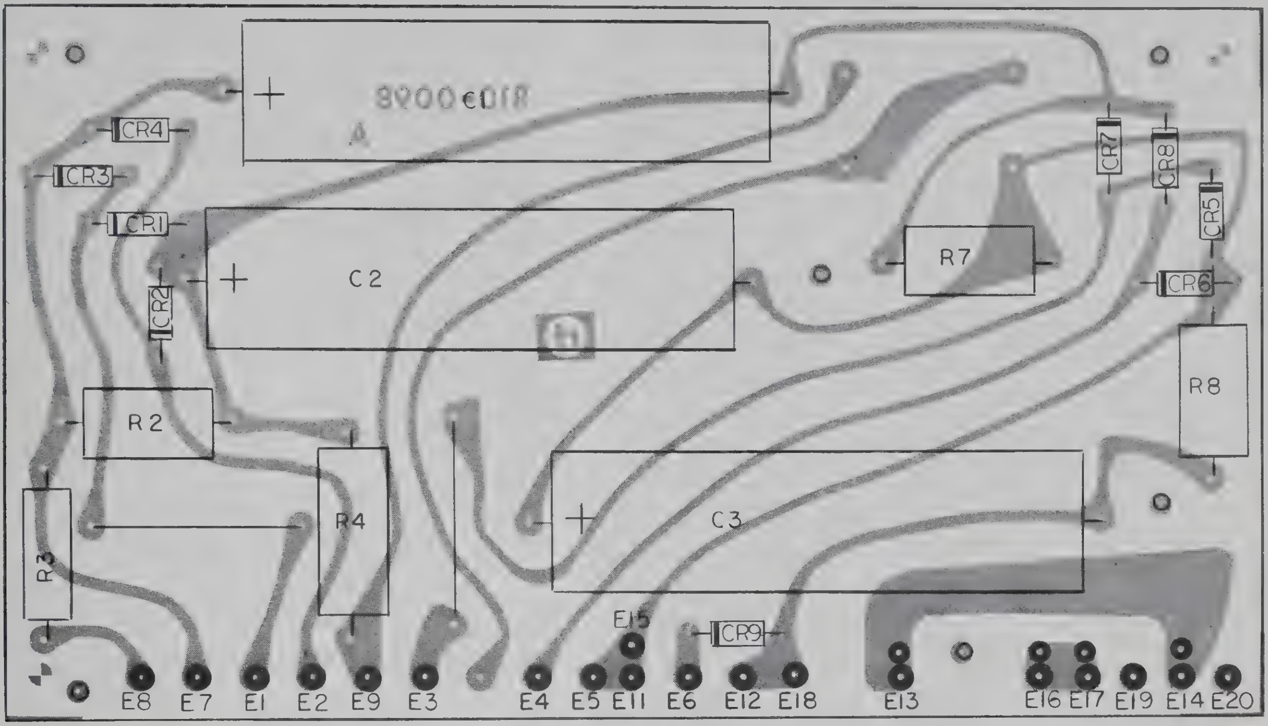
NOTES:
1 UNLESS SPECIFIED OTHERWISE, ALL RESISTORS ARE IN OHMS, 1/2 WATT, 10 % TOL., ALL CAPACITORS ARE IN PICOFARAD.
2 ⏚ DENOTES CHASSIS GROUND
3 C3 IS 12 PF FOR 132-148 MHZ AND 8.2PF FOR 148-174 MHZ

FIGURE 4. 15 - PA ASSEMBLY A4 SCHEMATIC DIAGRAM

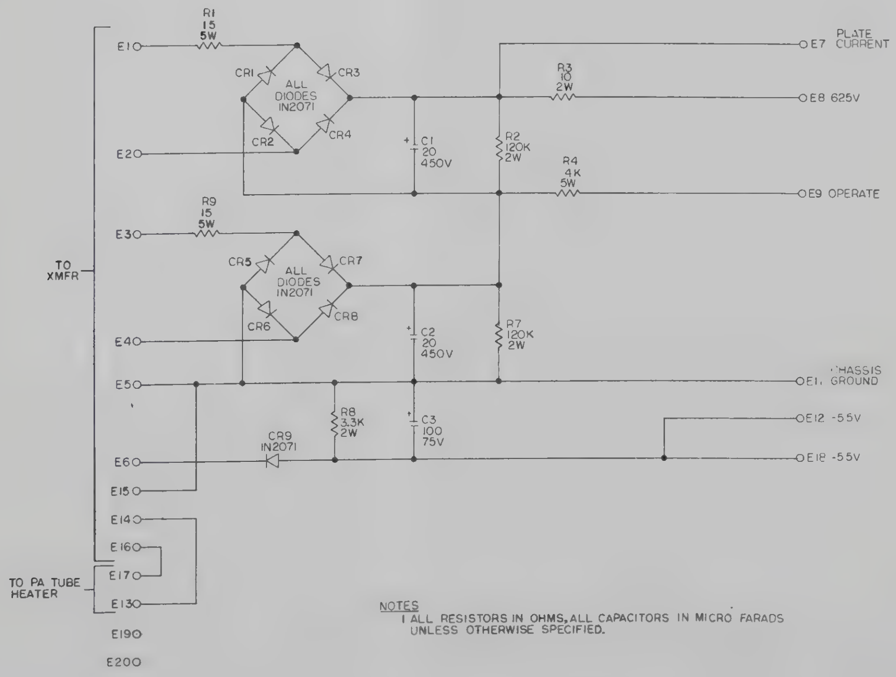
REF DESIG	DESCRIPTION	RF PART NUMBER
OSCILLATOR ASSEMBLY A3		
C1	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C2	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C3	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C4	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C5	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C6	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C7	Cap, Var, 1.7-14 pf	C-4644
C8	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C9	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C10	Cap, Var, 1.7-14 pf	C-4644
C11	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C12	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C13	Cap, Disc, NPO, 180 pf, 5%, 200 VDCW	C-4582
C14	Cap, Disc, NPO, 82 pf, 5%, 200 VDCW	C-6228
C15	Cap, Cer, 0.02 uf, +60%, -40%, 150 VDCW	C-0066
C16	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C17	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C18	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C19	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C20	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C21	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C22	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C23	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C24	Cap, Var, 1.7-14 pf	C-4644
C25	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C26	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C27	Cap, Var, 1.7-14 pf	C-4644
C28	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C29	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C30	Cap, Disc, NPO, 260 pf, 5%, 200 VDCW	C-4586
C31	Cap, Disc, NPO, 120 pf, 5%, 200 VDCW	C-4234
C32	Cap, Cer, 0.005 uf, +80%, -20%, 100 VDCW	C-2220
C33	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C34	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C35	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C36	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C37	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C38	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C39	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
CR1	4-channel oscillator only Diode, PS-5874	CR-0662
CR2	4-channel oscillator only Diode, PS-5874	CR-0662
CR3	Diode, PS-5874	CR-0662
CR4	Diode, PS-5874	CR-0662
CR5	4-channel oscillator only Diode, PS-5874	CR-0662
CR6	4-channel oscillator only Diode, PS-5874	CR-0662
CR7	Diode, PS-5874	CR-0662
CR8	Diode, PS-5874	CR-0662
L1	Inductor, 1.0 uh	L-0054
OSCILLATOR ASSEMBLY A3		
Q1	Transistor, 2N3638A	Q-0319
Q2	Transistor, 2N3644	Q-0315
Q3	Transistor, 2N3638A	Q-0319
Q4	Transistor, 2N3644	Q-0315
R1	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R2	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R3	Res, comp, 4.7K, 10%, 1/4W	R-0032
R4	Res, comp, 4.7K, 10%, 1/4W	R-0032
R5	Res, comp, 4.7K, 10%, 1/4W	R-0032
R6	Res, comp, 1K, 10%, 1/4W	R-0024
R7	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R8	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R9	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R10	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R11	Res, comp, 4.7K, 10%, 1/4W	R-0032
R12	Res, comp, 4.7K, 10%, 1/4W	R-0032
R13	Res, comp, 4.7K, 10%, 1/4W	R-0032
R14	Res, comp, 1K, 10%, 1/4W	R-0024
R15	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R16	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R17	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R18	Res, 1.8K, 10%, 1/4W	R-0027
R19	Res, 4.7K, 10%, 1/4W	R-0032
R20	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036
R21	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036
R22	Res, 10K, 10%, 1/4W	R-0036
R23	Res, 10K, 10%, 1/4W	R-0036
R24	Res, 4.7K, 10%, 1/4W	R-0032
R25	Res, comp, 100 ohm, 10%, 1/4W	R-0012
Y1	4-channel oscillator only Crystal, Receive, (specify frequency)	Y-0911
Y2	4-channel oscillator only Crystal, Receive (specify frequency)	Y-0911
Y3	Crystal, Receive (specify frequency)	Y-0911
Y4	Crystal, Receive (specify frequency)	Y-0911
Y5	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
Y6	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
Y7	Crystal, Transmit (specify frequency)	Y-0912
Y8	Crystal, Transmit (specify frequency)	Y-0912
	Crystal clamp	B483-0306
	Crystal clamp gasket	B483-0307

REF DESIG	DESCRIPTION	RF PART NUMBER
	POWER AMPLIFIER ASSEMBLY A4	
A1	PA Grid Board Assembly, see separate parts list	483-0175
A2	Capacitor/Coil Assembly,	
	132-142 MHz	483-0142
	142-148 MHz	
	148-159 MHz	483-0158
	159-174 MHz	483-0174
C1	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C2	Cap, Disc, Cer, 0.001 uf, 20%, 1 KVDCW	C-4815
C3	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C4	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C5	132-148 MHz	
	Cap, Air Var, 2-27 pf	C-4651
	148-174 MHz	
	Cap, Air Var, 1.4-13 pf	C-4649
L1	Coil Assembly	483-0269
L2	Coil Assembly	483-0269
L3	Choke, 1 uh	L-0054
L4	Choke, 1 uh	L-0054
L5	Coil Assembly	483-0162
R1	Res, comp, 100 ohm, 10%, 1/2W	R-0112
V1	Tube, Vacuum, 8509	V-0112
XV1	Tube, Socket	X-1004
	Plate strap assembly with heat sink	483-0166
	Plate strap assembly with heat sink	483-0166
	Heat sink, tube	B483-0187
	Heat sink, liner	B483-0188

REF DESIG	DESCRIPTION	RF PART NUMBER
	PA GRID BOARD ASSEMBLY A4A1	
C1	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C2	Cap, Disc, Cer, 8.2 pf, 20%, 1 KVDCW	C-4740
C3	132-148 MHz	
	Cap, Disc, Cer, 12 pf, 5%, 1 KVDCW	C-4742
	148-174 MHz	
	Cap, Disc, Cer, 8.2 pf, 20%, 1 KVDCW	C-4740
C4	Not used	
C5	Cap, Air Var, 1.4-9.2 pf	C-4642
L1	Coil Assembly	
	132-148 MHz	483-0276
	148-174 MHz	483-0182
L2	Coil Assembly	
	132-148 MHz	483-0277
	148-174 MHz	483-0183
R1	Res, comp, 1K, 10%, 1/2W	R-0124
R2	Res, comp, 3.9K, 10%, 1/2W	R-0131



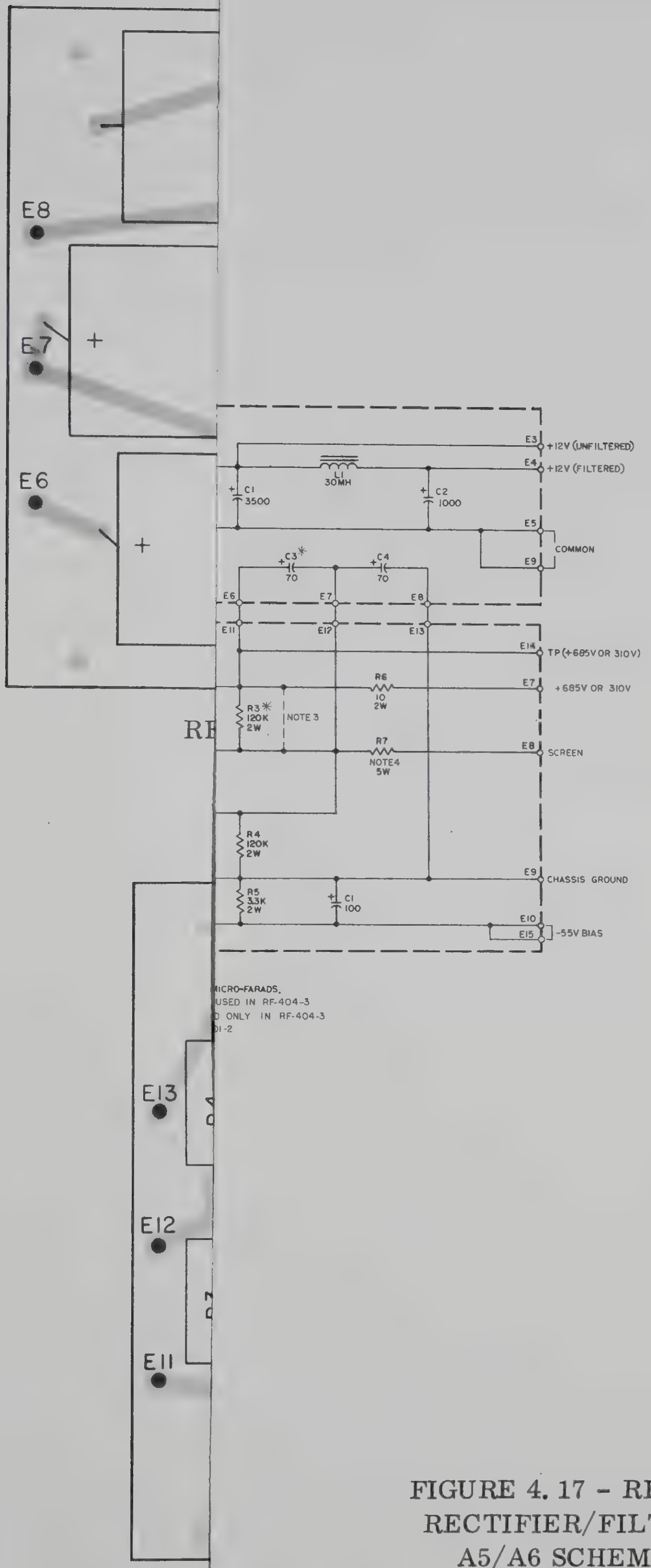
RECTIFIER/FILTER ASSEMBLY
A5 COMPONENT LOCATION



NOTES
1 ALL RESISTORS IN OHMS, ALL CAPACITORS IN MICRO FARADS UNLESS OTHERWISE SPECIFIED.

FIGURE 4.16 - RF-403-2 RECTIFIER/FILTER
ASSEMBLY A5 SCHEMATIC DIAGRAM

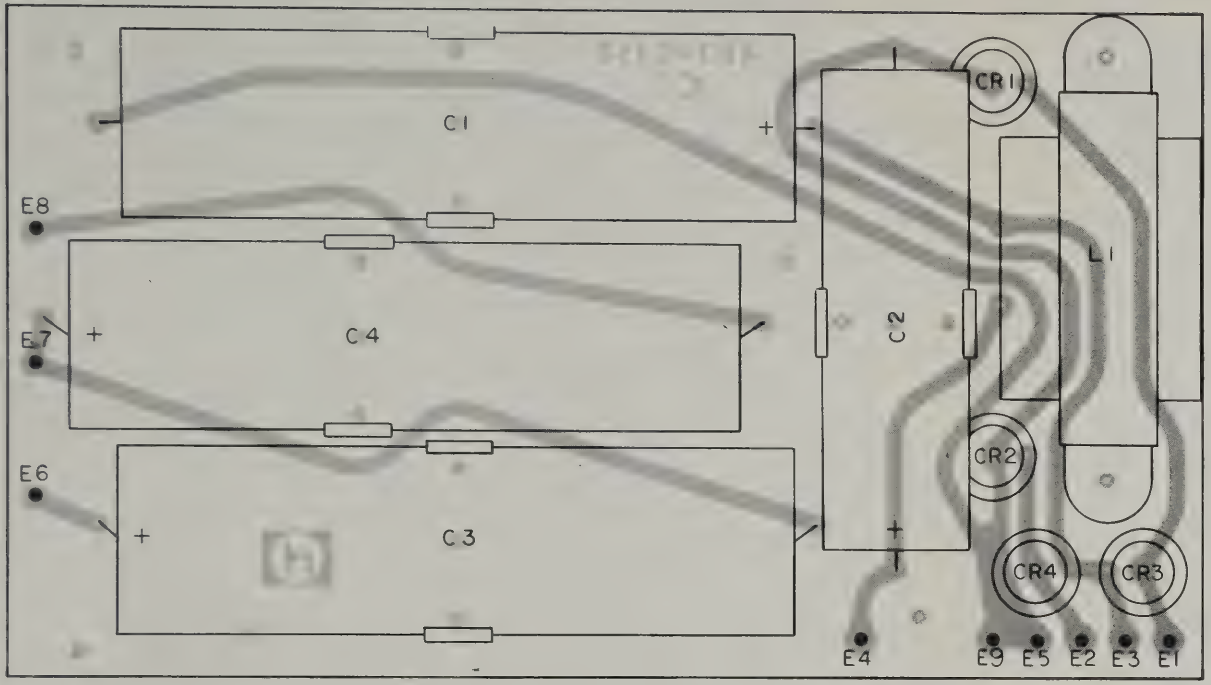
REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER/FILTER ASSEMBLY A5					
C1	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C2	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C3	Cap, Alum, Elec, 100 uf, +50%, -10%, 75 VDCW	C-4668			
CR1	Diode, 1N2071	CR-0001			
CR2	Diode, 1N2071	CR-0001			
CR3	Diode, 1N2071	CR-0001			
CR4	Diode, 1N2071	CR-0001			
CR5	Diode, 1N2071	CR-0001			
CR6	Diode, 1N2071	CR-0001			
CR7	Diode, 1N2071	CR-0001			
CR8	Diode, 1N2071	CR-0001			
CR9	Diode, 1N2071	CR-0001			
R1	Res, W.W., 15 ohm, 10%, 5W	R-3808			
R2	Res, comp, 120K, 10%, 2W	R-0349			
R3	Res, comp, 10 ohm, 5%, 2W	R-1801			
R4	Res, W.W., 4.0K, 10%, 5W	R-3837			
R5	Not used				
R6	Not used				
R7	Res, comp, 120K, 10%, 2W	R-0349			
R8	Res, comp, 3.3K, 10%, 2W	R-0330			



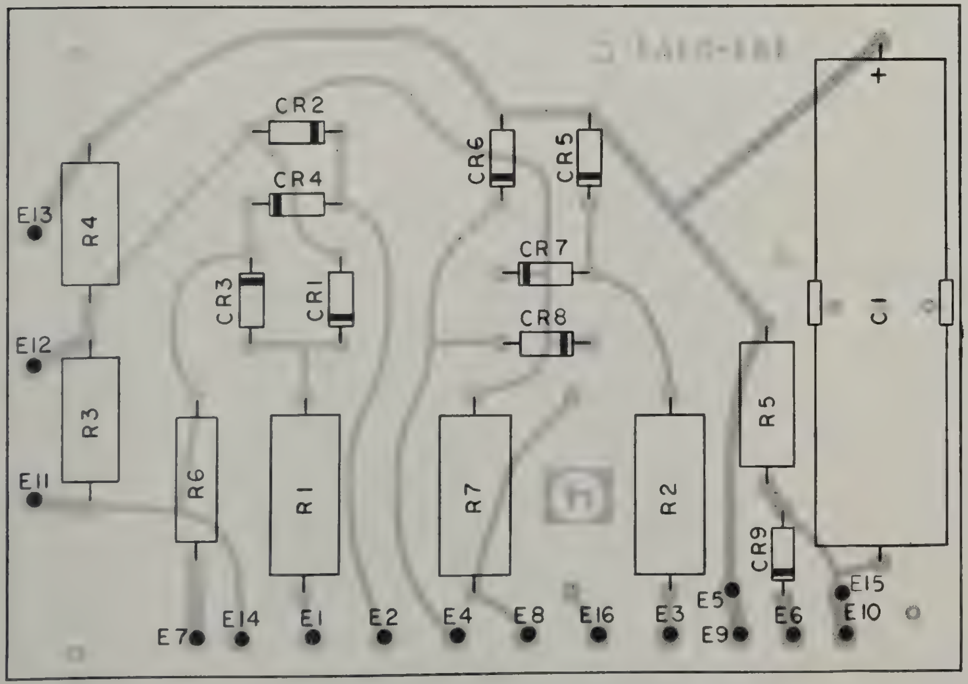
ICRO-FARADS.
USED IN RF-404-3
D ONLY IN RF-404-3
01-2

FIGURE 4. 17 - RF-401-2, RF-404-3
RECTIFIER/FILTER ASSEMBLIES
A5/A6 SCHEMATIC DIAGRAM

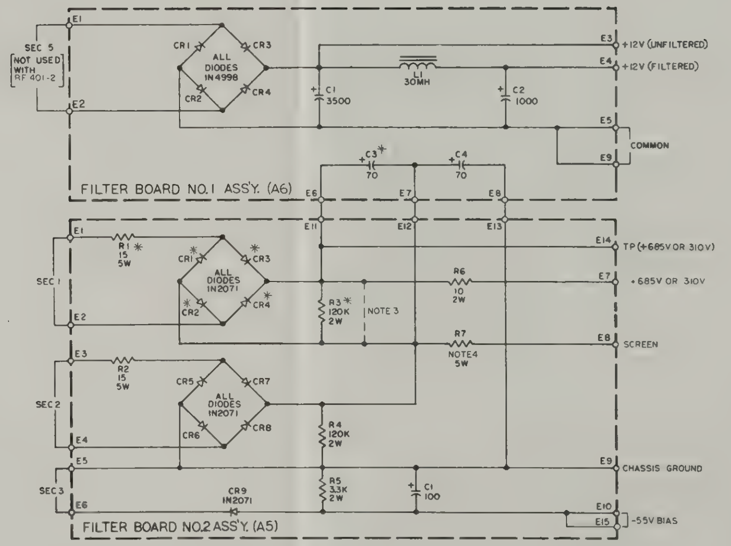
REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER/FILTER ASSEMBLY A5					
C1	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C2	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C3	Cap, Alum, Elec, 100 uf, +50%, -10%, 75 VDCW	C-4668			
CR1	Diode, 1N2071	CR-0001			
CR2	Diode, 1N2071	CR-0001			
CR3	Diode, 1N2071	CR-0001			
CR4	Diode, 1N2071	CR-0001			
CR5	Diode, 1N2071	CR-0001			
CR6	Diode, 1N2071	CR-0001			
CR7	Diode, 1N2071	CR-0001			
CR8	Diode, 1N2071	CR-0001			
CR9	Diode, 1N2071	CR-0001			
R1	Res, W.W., 15 ohm, 10%, 5W	R-3808			
R2	Res, comp, 120K, 10%, 2W	R-0349			
R3	Res, comp, 10 ohm, 5%, 2W	R-1801			
R4	Res, W.W., 4.0K, 10%, 5W	R-3837			
R5	Not used				
R6	Not used				
R7	Res, comp, 120K, 10%, 2W	R-0349			
R8	Res, comp, 3.3K, 10%, 2W	R-0330			



RECTIFIER/FILTER ASSEMBLY A6, COMPONENT LOCATION



RECTIFIER/FILTER ASSEMBLY
A5 COMPONENT LOCATION



NOTE:
1 ALL RESISTORS IN OHMS, ALL CAPACITOR IN MICRO-FARADS.
2 ASTERISKS (*) INDICATE COMPONENTS NOT USED IN RF-404-3
3 THE DOTTED LINE INDICATES A JUMPER USED ONLY IN RF-404-3
4 R7 IS 4.5K IN RF-404-3 AND 4.0K IN RF-401-2

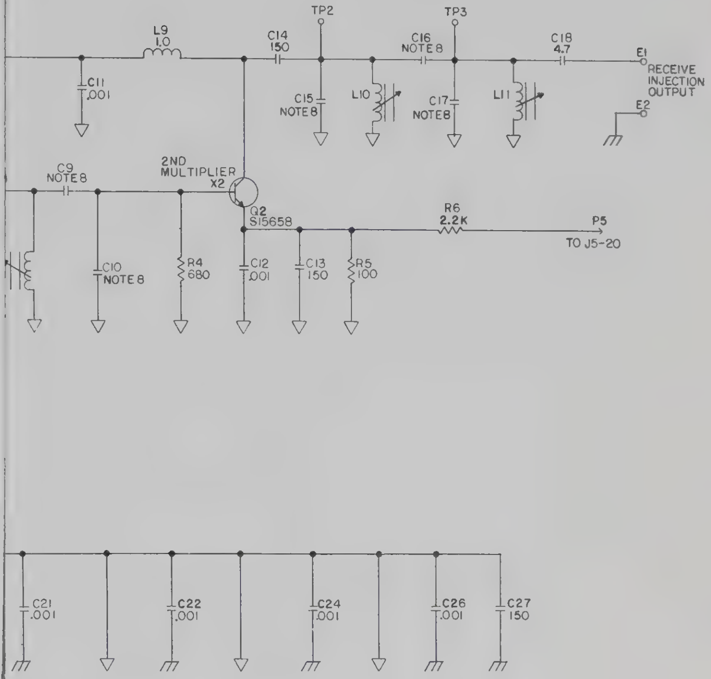
FIGURE 4.17 - RF-401-2, RF-404-3
RECTIFIER/FILTER ASSEMBLIES
A5/A6 SCHEMATIC DIAGRAM

RECTIFIER/FILTER ASSEMBLY A5

REF DESIG	DESCRIPTION	RF PART NUMBER
C1	Cap, Alum, Elect, 100 uf, +50%, -10%, 75 VDCW	C-4668
CR1	RF-401-2 only Diode, 1N2071	CR-0001
CR2	RF-401-2 only Diode, 1N2071	CR-0001
CR3	RF-401-2 only Diode, 1N2071	CR-0001
CR4	RF-401-2 only Diode, 1N2071	CR-0001
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
CR8	Diode, 1N2071	CR-0001
CR9	Diode, 1N2071	CR-0001
R1	RF-401-2 only Res, W.W., 15 ohm, 10%, 5W	R-3808
R2	Res, W.W., 15 ohm, 10%, 5W	R-3808
R3	RF-401-2 only Res, comp, 120K, 10%, 2W	R-0349
R4	Res, comp, 120K, 10%, 2W	R-0349
R5	Res, comp, 3.3K, 10%, 2W	R-0330
R6	Res, comp, 10 ohm, 5%, 2W	R-1801
R7	RF-401-2 Res, W.W., 4.0K, 10%, 5W	R-3837
	RF-404-3 Res, W.W., 4.5K, 10%, 5W	R-3838

RECTIFIER FILTER ASSEMBLY A6

REF DESIG	DESCRIPTION	RF PART NUMBER
C1	Cap, Alum., Elect., 3500 uf, +50%, -10%, 20 VDCW	C-4663
C2	Cap, Alum., Elect., 1000 uf, +50%, -10%, 20 VDCW	C-4655
C3	RF-401-2 only Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
C4	Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N4998	CR-0666
CR3	Diode, 1N4998	CR-0666
CR4	Diode, 1N4998	CR-0666
L1	Choke, Filter, 30 mh	L-0571



ANGES REQUIRED FOR BAND COVERAGE

MHZ	132-140	140 148	148 162	162 174
C5	18	18	12	12
C6	1.0	1.0	.82	.82
C7	18	18	12	12
C8	1.0	1.0	.82	.82
C9	27	27	18	18
C10	33	33	27	27
C15	27	22	18	15
C16	1.5	1.5	1.2	1.2
C17	22	20	15	12

FIGURE 4.18 - MULTIPLIER ASSEMBLY A7
SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
	RECTIFIER/FILTER ASSEMBLY A5	
C1	Cap, Alum, Elect, 100 uf, +50%, -10%, 75 VDCW	C-4668
CR1	RF-401-2 only Diode, 1N2071	CR-0001
CR2	RF-401-2 only Diode, 1N2071	CR-0001
CR3	RF-401-2 only Diode, 1N2071	CR-0001
CR4	RF-401-2 only Diode, 1N2071	CR-0001
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
CR8	Diode, 1N2071	CR-0001
CR9	Diode, 1N2071	CR-0001
R1	RF-401-2 only Res, W.W., 15 ohm, 10%, 5W	R-3808
R2	Res, W.W., 15 ohm, 10%, 5W	R-3808
R3	RF-401-2 only Res, comp, 120K, 10%, 2W	R-0349
R4	Res, comp, 120K, 10%, 2W	R-0349
R5	Res, comp, 3.3K, 10%, 2W	R-0330
R6	Res, comp, 10 ohm, 5%, 2W	R-1801
R7	RF-401-2 Res, W.W., 4.0K, 10%, 5W RF-404-3 Res, W.W., 4.5K, 10%, 5W	R-3837 R-3838

REF DESIG	DESCRIPTION	RF PART NUMBER
	RECTIFIER FILTER ASSEMBLY A6	
C1	Cap, Alum., Elect., 3500 uf, +50%, -10%, 20 VDCW	C-4663
C2	Cap, Alum., Elect., 1000 uf, +50%, -10%, 20 VDCW	C-4655
C3	RF-401-2 only Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
C4	Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N4998	CR-0666
CR3	Diode, 1N4998	CR-0666
CR4	Diode, 1N4998	CR-0666
L1	Choke, Filter, 30 mh	L-0571

MULTIPLIER ASSEMBLY A7, VOLTAGE/RESISTANCE CHART

Stage	Voltage (DC)			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
Q1	0	+1.1	+10	1 Ω (1) 1 Ω (1)	110 Ω (2) 17 Ω (1)	110 Ω (2) 17 Ω (1)
Q2	0	+0.7	+10	4 Ω (1) 4 Ω (1)	110 Ω (2) 18 Ω (1)	100 Ω (2) 16 Ω (1)

NOTES:

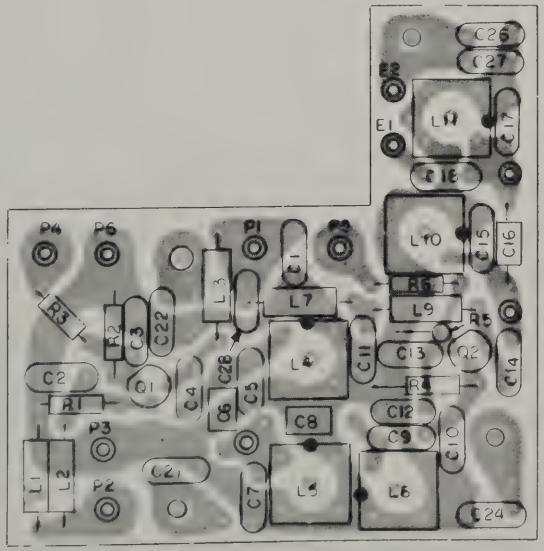
1. Resistance — Negative Ground / Positive Ground

   (1) R x 1 range
   (2) R x 100 range
   (3) R x 10,000 range

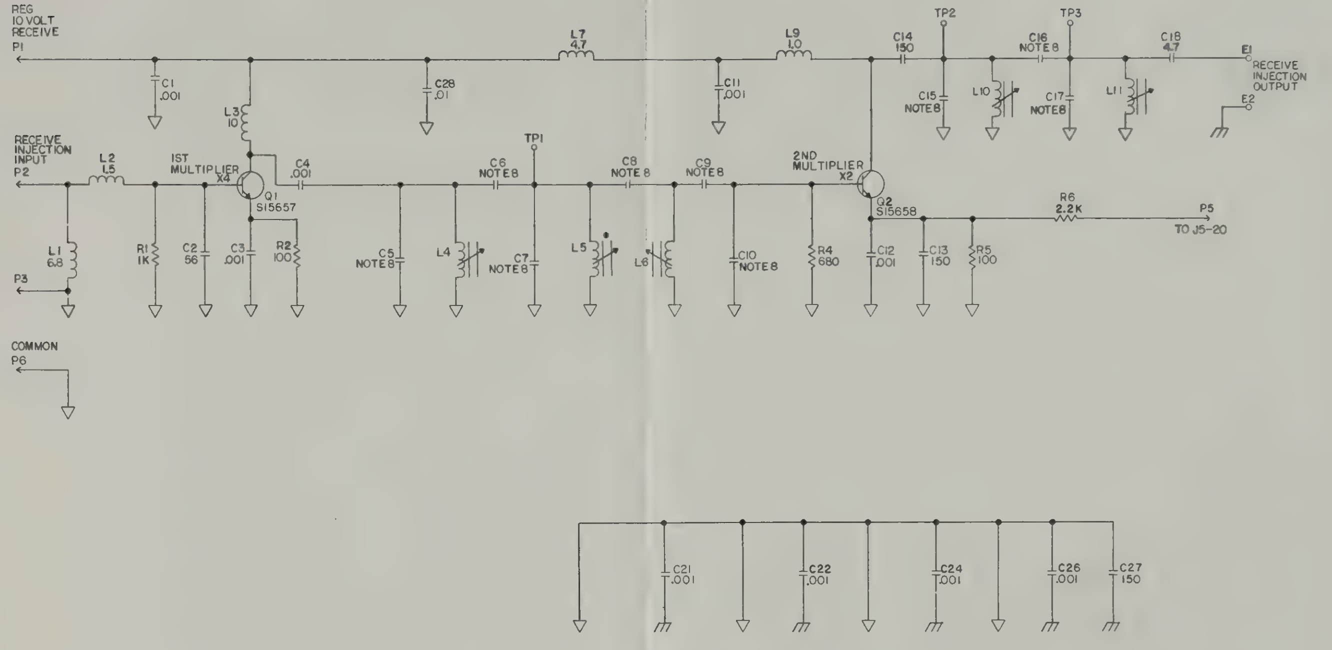
2. Measurements made with Simpson Model 260 VOM under no signal condition.

3. Measurements shown are actual readings and may vary by 15%.

4. Resistance measurements made with board disconnected.



MULTIPLIER ASSEMBLY A7,
COMPONENT LOCATION



NOTES
1 ALL RESISTORS IN OHMS, 10%, 1/4WATT, UNLESS OTHERWISE SPECIFIED.
2 ALL CAPACITORS IN PICO FARADS UNLESS OTHERWISE SPECIFIED.
3 ALL INDUCTORS IN μH UNLESS OTHERWISE SPECIFIED.
4 ⏚ DENOTES CHASSIS GROUND.
5 ▽ DENOTES COMMON LINE.
6 ALL DC VOLTAGES REFERRED TO "COMMON" LINE.
7 ALL AC VOLTAGES REFERRED TO CHASSIS GROUND.

8 CHANGES REQUIRED FOR BAND COVERAGE

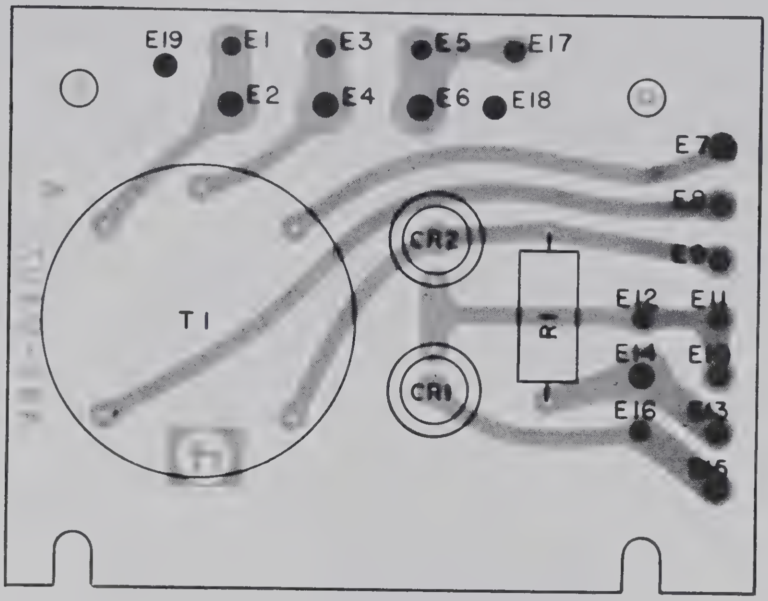
MHZ	132-140	140-148	148-162	162-174
C5	18	18	12	12
C6	1.0	1.0	.82	.82
C7	18	18	12	12
C8	1.0	1.0	.82	.82
C9	27	27	18	18
C10	33	33	27	27
C15	27	22	18	15
C16	1.5	1.5	1.2	1.2
C17	22	20	15	12

FIGURE 4. 18 - MULTIPLIER ASSEMBLY A7
SCHEMATIC DIAGRAM

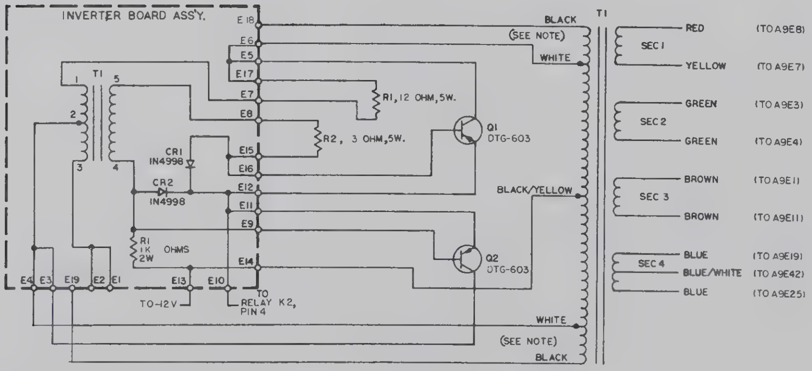
SCRIPTION	RF PART NUMBER
'er, pf, 20%, VDCW	C-4794
'er, pf, 20%, VDCW	C-4794
0 MHz 'er,), 27 pf, 5%, VDCW	C-4748
8 MHz 'er,), 22 pf, 5%, VDCW	C-4746
2 MHz 'er,), 18 pf, 5%, VDCW	C-4744
4 MHz 'er,), 15 pf, 5%, VDCW	C-4743
8 MHz 'er, pf, 5%, VDCW	C-4612
4 MHz 'er, pf, 5%, VDCW	C-4610
0 MHz 'er,), 22 pf, 5%, VDCW	C-4746
8 MHz 'er,), 20 pf, 5%, VDCW	C-4745
2 MHz 'er,), 15 pf, 5%, VDCW	C-4743
4 MHz 'er,), 12 pf, 5%, VDCW	C-4742
'er, pf, 5%, VDCW	C-4624
ed isc,)1 uf, GMV, VDCW	C-0001
ed isc,)1 uf, GMV, VDCW	C-0001
ed isc,)1 uf, GMV, VDCW	C-0001
ed isc,)1 uf, GMV, VDCW	C-0001

MULTIPLIER ASSEMBLY A7

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
C27	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794			
C28	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065			
L1	Choke, 6.8 uh	L-0081			
L2	Choke, 1.5 uh	L-0076			
L3	Choke, 10 uh	L-0057			
L4	Inductor Assembly, Var	483-0228			
L5	Inductor Assembly, Var	483-0228			
L6	Inductor Assembly, Var	483-0228			
L7	Choke, 4.7 uh	L-0056			
L8	Not used				
L9	Choke, 1.0 uh	L-0054			
L10	Inductor Assembly, Var	483-0229			
L11	Inductor ASsembly, Var	483-0229			
Q1	Transistor, S15657	Q-0354			
Q2	Transistor, S15658	Q-0355			
R1	Res, comp, 1K, 10%, 1/4W	R-0024			
R2	Res, comp, 100 ohm, 10%, 1/4W	R-0012			
R3	Not used				
R4	Res, comp, 680 ohm, 10%, 1/4W	R-0022			
R5	Res, comp, 100 ohm, 10%, 1/4W	R-0012			
R6	Res, comp, 2.2K, 10%, 1/4W	R-0028			



DC/AC INVERTER BOARD ASSEMBLY
A8A1 COMPONENT LOCATION



NOTE:

WIRING SHOWN FOR T1 IS FOR NORMAL (13.6VDC NOMINAL) VOLTAGE. FOR OPERATION ABOVE 15.0 VDC CONNECT BLACK WIRES OF T1 TO E4 & E6 OF THE CONVERTER BOARD ASS'Y. AND THE WHITE WIRES OF T1 TO E19 & E18.

FIGURE 4. 19 - 13. 6 VOLT DC/AC INVERTER
ASSEMBLY A8 SCHEMATIC DIAGRAM

MULTIPLIER ASSEMBLY A7

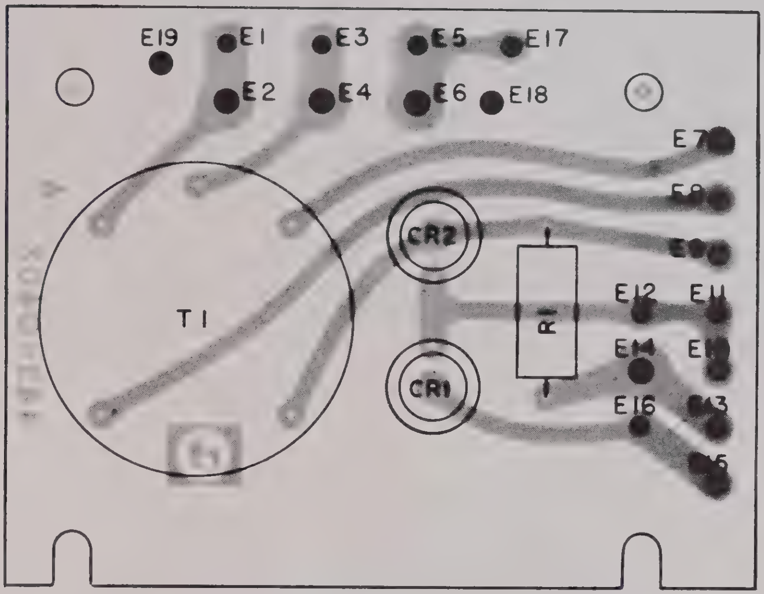
REF DESIG	DESCRIPTION	RF PART NUMBER
C1	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C2	Cap, Cer, 56 pf, 20%, 1 KVDCW	C-4786
C3	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C4	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C5	132-148 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	148-174 MHz Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C6	132-148 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4608
	148-174 MHz Cap, Cer, 0.82 pf, 5%, 500 VDCW	C-4606
C7	132-148 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	148-174 MHz Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	132-148 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4608
	148-174 MHz Cap, Cer, 0.82 pf, 5%, 500 VDCW	C-4606
C9	132-148 MHz Cap, Cer, NPO, 27 pf, 5%, 1 KVDCW	C-4748
	148-174 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
C10	132-148 MHz Cap, Cer, NPO, 33 pf, 5%, 1 KVDCW	C-4750
	148-174 MHz Cap, Cer, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C11	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C12	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001

REF DESIG	DESCRIPTION	RF PART NUMBER
C13	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C14	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C15	132-140 MHz Cap, Cer, NPO, 27 pf, 5%, 1 KVDCW	C-4748
	140-148 MHz Cap, Cer, NPO, 22 pf, 5%, 1 KVDCW	C-4746
	148-162 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	162-174 MHz Cap, Cer, NPO, 15 pf, 5%, 1 KVDCW	C-4743
C16	132-148 MHz Cap, Cer, 1.5 pf, 5%, 500 VDCW	C-4612
	148-174 MHz Cap, Cer, 1.2 pf, 5%, 500 VDCW	C-4610
C17	132-140 MHz Cap, Cer, NPO, 22 pf, 5%, 1 KVDCW	C-4746
	140-148 MHz Cap, Cer, NPO, 20 pf, 5%, 1 KVDCW	C-4745
	148-162 MHz Cap, Cer, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	162-174 MHz Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C18	Cap, Cer, 4.7 pf, 5%, 1 KVDCW	C-4624
C19	Not used	
C20	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C21	Not used	
C22	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C23	Not used	
C24	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C25	Not used	
C26	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001

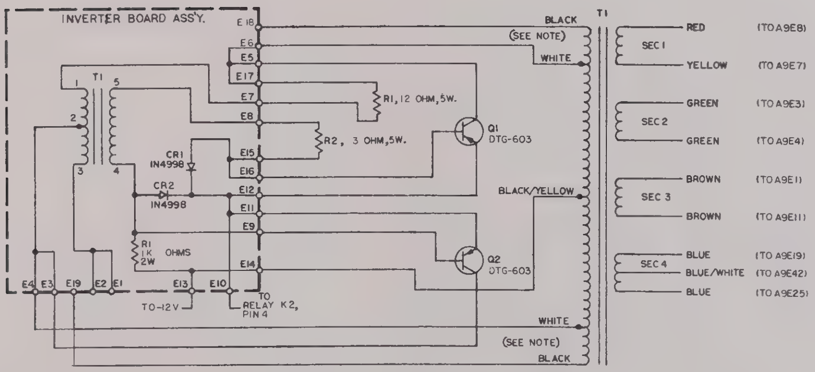
MULTIPLIER ASSEMBLY A7

REF DESIG	DESCRIPTION	RF PART NUMBER
C27	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C28	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
L1	Choke, 6.8 uh	L-0081
L2	Choke, 1.5 uh	L-0076
L3	Choke, 10 uh	L-0057
L4	Inductor Assembly, Var	483-0228
L5	Inductor Assembly, Var	483-0228
L6	Inductor Assembly, Var	483-0228
L7	Choke, 4.7 uh	L-0056
L8	Not used	
L9	Choke, 1.0 uh	L-0054
L10	Inductor Assembly, Var	483-0229
L11	Inductor ASsembly, Var	483-0229
Q1	Transistor, S15657	Q-0354
Q2	Transistor, S15658	Q-0355
R1	Res, comp, 1K, 10%, 1/4W	R-0024
R2	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R3	Not used	
R4	Res, comp, 680 ohm, 10%, 1/4W	R-0022
R5	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R6	Res, comp, 2.2K, 10%, 1/4W	R-0028

REF DESIG	DESCRIPTION	RF PART NUMBER



DC/AC INVERTER BOARD ASSEMBLY
A8A1 COMPONENT LOCATION

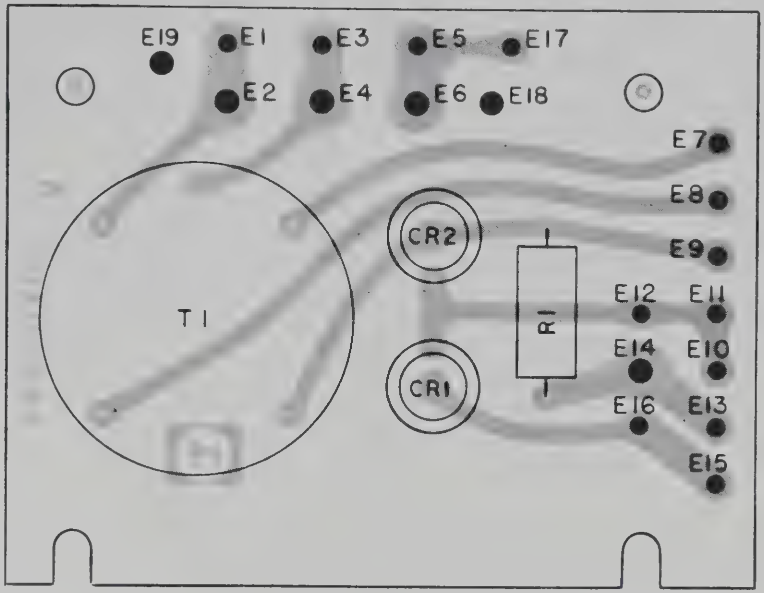


NOTE: WIRING SHOWN FOR T1 IS FOR NORMAL (13.6VDC NOMINAL) VOLTAGE. FOR OPERATION ABOVE 15.0 VDC CONNECT BLACK WIRES OF T1 TO E4 & E6 OF THE CONVERTER BOARD ASS'Y. AND THE WHITE WIRES OF T1 TO E19 & E18.

FIGURE 4. 19 - 13. 6 VOLT DC/AC INVERTER
ASSEMBLY A8 SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
13.6 VOLT DC/AC INVERTER A8		
A1	DC/AC Inverter Board Assembly, see separate parts list	484-0405
Q1	Transistor, DTG-603	Q-0350
Q2	Transistor, DTG-603	Q-0350
R1	Res, comp, 12 0hm, 5%, 5W	R-3994
R2	Res, comp, 3 ohm, 5%, 5W	R-3995
T1	Transformer, power	T-0192

REF DESIG	DESCRIPTION	RF PART NUMBER
DC/AC INVERTER BOARD ASSEMBLY A8A1		
CR1	Diode, 3AF1	CR-0079
CR2	Diode, 3AF1	CR-0079
R1	Res, comp, 1K, 10%, 2W	R-0324
T1	Transformer, feedback	T-0043



DC/AC INVERTER BOARD ASSEMBLY
A8A1 COMPONENT LOCATION

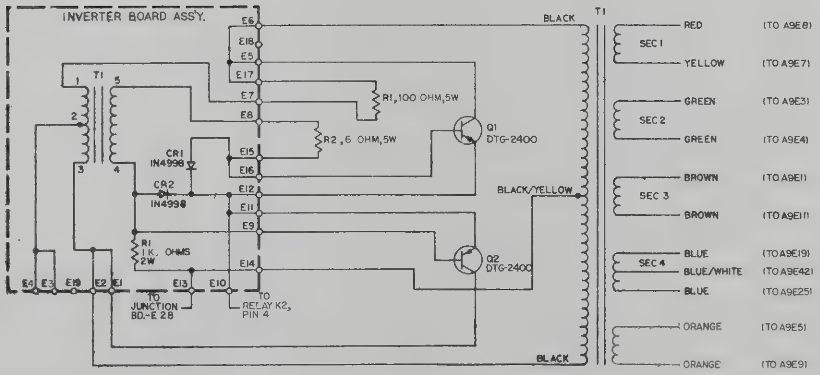
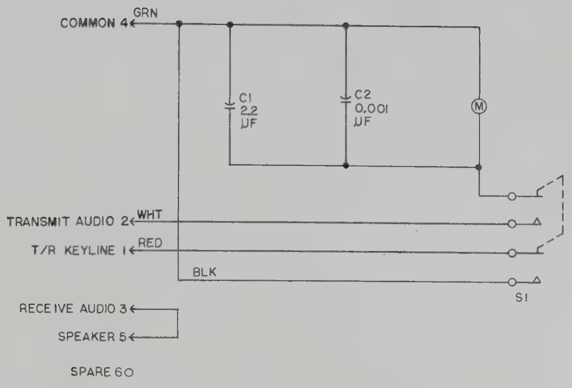


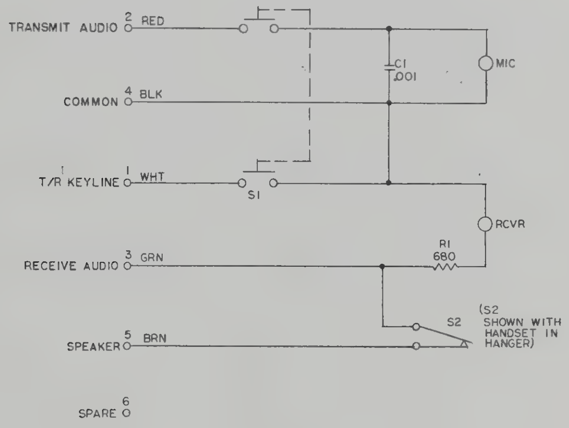
FIGURE 4.20 - 27.5 VOLT DC/AC INVERTER
ASSEMBLY A8 SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
27.5 VOLT DC/AC INVERTER A8		
A1	DC/AC Inverter Board Assembly, see separate parts list	483-0405
Q1	Transistor, DTG-2400	Q-0367
Q2	Transistor, DTG-2400	Q-0367
R1	Res, comp, 100 ohm, 5%, 5W	R-3990
R2	Res, comp, 6 ohm, 5%, 5W	R-3988
T1	Transformer, power	T-0236

REF DESIG	DESCRIPTION	RF PART NUMBER
DC/AC INVERTER BOARD ASSEMBLY A8A1		
CR1	Diode, 3AF1	CR-0079
CR2	Diode, 3AF1	CR-0079
R1	Res, comp, 1K, 10%, 2W	R-0324
T1	Transformer, feedback	T-0233



(A) MICROPHONE



(B) HANDSET/HANGER

FIGURE 4.21 - HANDSET/HANGER AND MICROPHONE SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
	HANDSET/HANGER ASSEMBLY				
	Handset Assembly	483-0591			
C1	Cap, Cer, 0.001 uf, GMV, 500 VDCW	C-0001			
S1	Switch	S-0276			
	Handle	MP-3974			
	Transmitter Cap	MP-3975			
	Receiver Cap	MP-3976			
	Transmitter Button	MP-3952			
	Receiver Button	MP-3955			
	Transmitter Cup Assembly	MP-3977			
	Insert, Fiberboard	MP-3978			
	Strain Relief	MP-3990			
	Cord, Coiled, 4-conductor	W-1799			
	Hanger/Cable Assembly				
P1	Plug, Male, 6 pin	P-0530/36			
R1	Res, comp, 680 ohm, 10%, 1/4W	R-0022			
S1	Switch assembly	S-0277			
TB1	Terminal Board	TB-0186			
	Cradle	484-0589			
	Cable, 5-conductor	W-0958			

R F COMMUNICATIONS, INC.
1680 UNIVERSITY AVENUE ■ ROCHESTER, NEW YORK 14610, U.S.A.

rf

INSTRUCTION MANUAL

IM-1000

VHF FM TRANSCEIVER MODELS RF-401-2, RF-403-2, RF-404-3

RF COMMUNICATIONS, INC. ■ ROCHESTER, NEW YORK, U.S.A.

WARRANTY

R F Communications, Inc. warrants the equipment purchased hereunder to be free from defect in material and workmanship under normal use and service, when used for the purpose for which the same is designed, for a period of one year from the date of delivery, provided that notice of such defect is given to R F Communications within sixty (60) days after the discovery thereof and provided that inspection by R F Communications indicates the parts are defective to R F Communications' reasonable satisfaction. R F Communications' obligations under this warranty are limited to the repair or replacement of defective parts and the return of such repaired or replaced parts to the purchaser F.O.B. factory. At R F Communications' option, any defective part shall be returned to R F Communications' factory for inspection, properly packed and all expenses prepaid. No parts shall be returned unless the purchaser first obtains a return authorization number, which will be furnished on request. Electron tubes are warranted in accordance with the manufacturer's standard tube warranty policy, which will be furnished on request. Equipment furnished by R F Communications, but manufactured by another, bears only the warranty given by such other manufacturer, which will be furnished on request. No warranties other than those set forth in this section are given or are to be implied with respect to the equipment furnished hereunder and R F Communications shall in no event be liable for consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause.

CORRESPONDENCE AND PARTS ORDERING

Whenever writing about this unit or ordering parts, always refer to the model and serial numbers and the approximate date of purchase. Special parts should be ordered by the R F part number and the schematic designation number. Standard parts can be obtained from your local parts distributor.

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No equipment or part thereof shall be returned to R F Communications unless the purchaser first obtains a return merchandise authorization number from R F Communications. This number is to be marked on the shipping container.

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SPECIFICATIONS

	Fixed RF-403-2	Mobile RF-403-2	Marine RF-401-2	Aircraft RF-404-3
PHYSICAL				
Size - 4-3/4" h (12cm) x 13" w (33cm) x 13-3/4" d (35cm)	X	X	X	X
Weight	20 lbs (9. 1 kg)	21 lbs (9. 53 kg)	21 lbs (9. 53 kg)	22. 5 lbs (10. 3 kg)
Mounting Position - any	X	X	X	X
Cooling - Conduction/Radiation	X	X	X	X
Housing - Vinyl painted cabinet. Drip-proof, dust-tight construction.	X	X	X	X
Cable Entry - rear	X	X	X	X
ELECTRICAL				
Number of Channels	2	4	12	12
Frequency Range (MHz)	132 to 174	132 to 174	132 to 174	138 to 143
Operating Temperature Range	-30°C (-22°F) to +60°C (+140°F)			
Elevation (Ft. above Mean Sea Level)	0 to 15,000			0 to 45,000
Humidity	0 to 95% at +50°C (+122°F)			
T/R Changeover Time (seconds)	0. 7	0. 7	0. 7	0. 7
Channel Change Time	Instantaneous			
Frequency Stability (parts per million)	10	10	10	10
Frequency Spread	2 MHz at 141 MHz			

SPECIFICATIONS (Cont)

	Fixed RF-403-2	Mobile RF-403-2	Marine RF-401-2	Aircraft RF-404-3
ELECTRICAL (Cont.)				
Antenna Impedance (ohms)	50	50	50	50
Emission	16F3	16F3	16F3	16F3
Control	Local	Local	Local	Remote
Primary Voltage (vdc) positive or negative ground	13. 6 ± 20%	13. 6± 20%	13. 6± 20%	27. 5± 2 vdc
Current Drain - Monitor (amps)	0. 1	0. 1	0. 1	0. 1
Transmit (amps)	17. 0	17. 0	17. 0	5. 0
TRANSMITTER				
Type of Service	Intermittant (EIA)			
Power Output (watts)	80	80	80	25
Deviation	±5 kHz for 100% modulation at 1 kHz			
Spurious Attenuation - Conducted	-80dB	-80dB	-80dB	-80dB
Radiated	-60dB	-60dB	-60dB	-60dB
FM Hum and Noise	-40dB	-40dB	-40dB	-40dB
AM Hum and Noise	-34dB	-34dB	-34dB	-34dB
Maximum Distortion	10% at 1 kHz			
Audio Response	Within +1 and -3dB of a true 6 dB per octave pre-emphasis characteristic from 300 to 3000 Hz; roll-off to -50 dB at 20 kHz.			
Modulation Limiting	5 kHz	5 kHz	5 kHz	5 kHz
Occupied Bandwidth	20 kHz	20 kHz	20 kHz	20 kHz

SPECIFICATIONS (Cont)

	Fixed RF-403-2	Mobile RF-403-2	Marine RF-401-2	Aircraft RF-404-3
RECEIVER				
Type of Service	Continuous			
Useable Sensitivity	0.4 uV for 12 dB SINAD			
Quieting Sensitivity	0.50 uV for 20 dB			
Squelch Sensitivity	0.35uV	0.35uV	0.35uV	0.35uV
Adjacent Channel Selectivity	-75dB	-75dB	-75dB	-75dB
Spurious Response Attenuation	-85dB	-85dB	-85dB	-85dB
Intermodulation Spurious Attenuation	-65dB from useable sensitivity			
Image Response	-70dB	-70dB	-70dB	-70dB
Hum and Noise - Unsquelched	40dB	40dB	40dB	40dB
Squelched	50dB	50dB	50dB	50dB
Audio Output Power	4 watts with less than 10% distortion			
Audio Response	Within +2 to -8dB of a true 6dB per octave de-emphasis characteristic from 300 to 3000 Hz.			

CHAPTER 1

INSTALLATION

1.1 INSTALLATION PLANNING

1.1.1 Marine Installations

The location in which the transceiver is installed should allow easy access to the front panel controls as well as providing for good air circulation around the transceiver to obtain maximum cooling. Also allow sufficient clearance at the rear of the transceiver to provide easy access to the fuses and cable connectors. As with all marine installations, some protection should be provided to protect the transceiver from rain and heavy seas.

The transceiver should be located as close as possible to the primary power source and antenna in order to keep the power and antenna cables as short as possible. These cables should also be as far as practical from any noise sources. Also keep in mind that some navigation instruments, such as magnetic compasses and radio direction finders can be affected by rf radiation. Therefore, the transceiver and associated cables should not be installed adjacent to these instruments.

1.1.2 Aircraft Installations

As the transceiver in this installation is to be remotely controlled, the location in which the transceiver is installed need not provide easy access to the front panel controls. However, sufficient room should be provided at the rear panel for access to the fuses and connectors as well as providing for good air circulation to obtain maximum cooling. As some equipment, such as marker beacons and ILS receivers, could be affected by rf radiation, the transceiver should not be installed adjacent to these receivers.

In order to minimize power and signal losses, the transceiver should be located as close as possible to the antenna and primary power source. These cables should also be kept as far as practical from any noise sources.

Refer to instruction manual IM-0201 for installation planning and installation instructions for the RF-423 Remote Control.

1.1.3 Mobile Installations

In a mobile installation, the transceiver should be located to provide easy access to the front panel controls and rear panel connectors and fuses. The location should also allow for good air circulation to obtain maximum cooling. The transceiver should not be located in such a position as to interfere with the normal operation of the vehicle.

In order to minimize power and signal loss, the transceiver should be located as close as possible to the power source and antenna. The power and antenna cables should also be kept as far as practical from any sources of noise.

1.1.4 Fixed Installations

As in the other types of installations, the transceiver should be located so as to provide easy access to the front panel controls and rear panel connectors and fuses. The location should also allow good air circulation to obtain maximum cooling.

The transceiver should be located as close as possible to the power source and antenna to keep the power and antenna cables as short as possible to minimize line losses. These cables should also be kept away from any sources of noise.

1.2 INSTALLATION PROCEDURES

1.2.1 Transceiver Installation With Hanger Bracket

a) Referring to figure 1.1(B), mark and drill the four mounting holes. (Use a #20 twist drill.)

b) Referring to figure 1.2, place the hanger bracket over the holes, with the slots facing forward.

Note

> Whether the hanger bracket is located above or below the transceiver, the slots must face forward.

c) Secure hanger bracket to mounting surface using the four #12 x 3/4" long self-tapping screws supplied.

d) Referring to figure 1.2, secure the two 3/8" x 1/4" nylon spacers to the case using the two 8-32 x 1/4" long pan head screws.

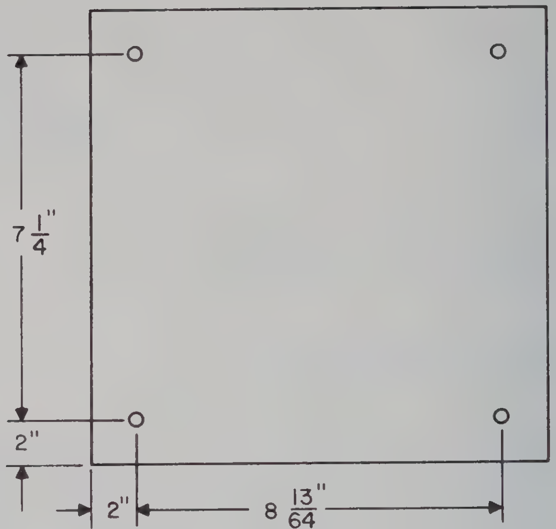
e) Carefully slide case into hanger bracket so that nylon spacers are in hanger bracket slots.

Note

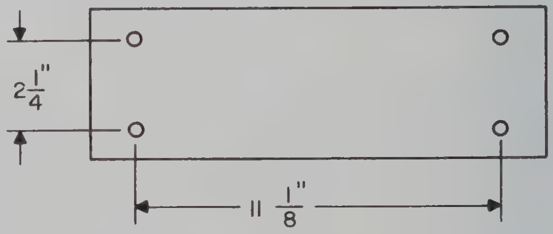
> If severe vibration conditions are encountered or expected, mount the transceiver in the hanger bracket using the slots closest to the bottom of the hanger bracket.

f) Insert knobs into case through curved slots in hanger bracket and tighten.

g) Refer to paragraph 1.3 for electrical connection procedures.



(A) CASE MOUNTING HOLE DIMENSIONS



(B) HANGER BRACKET MOUNTING HOLE DIMENSIONS

FIGURE 1.1 - TRANSCEIVER MOUNTING HOLE DIMENSIONS

1.2.2 Transceiver Installation Without Hanger Bracket

a) Referring to figure 1.1(A), mark and drill the four mounting holes. (Use a #20 twist drill.)

b) Remove the four rubber feet from the bottom of the case.

c) Place the case over the four mounting holes.

d) Secure the case to the mounting surface using the four #12 x 3/4" long self-tapping screws supplied.

e) Refer to paragraph 1.3 for electrical connection procedures.

1.2.3 Handset and Hanger Installation

To install the handset and hanger, refer to figure 1.3.

1.2.4 Extension Speaker Installation

To install the extension speaker, refer to figure 1.4.

CAUTION

Remove jumper wire connected between terminals 5 and 6 on TB2 when extension speaker is connected to transceiver. If extension speaker is disconnected, be sure to reconnect the jumper wire.

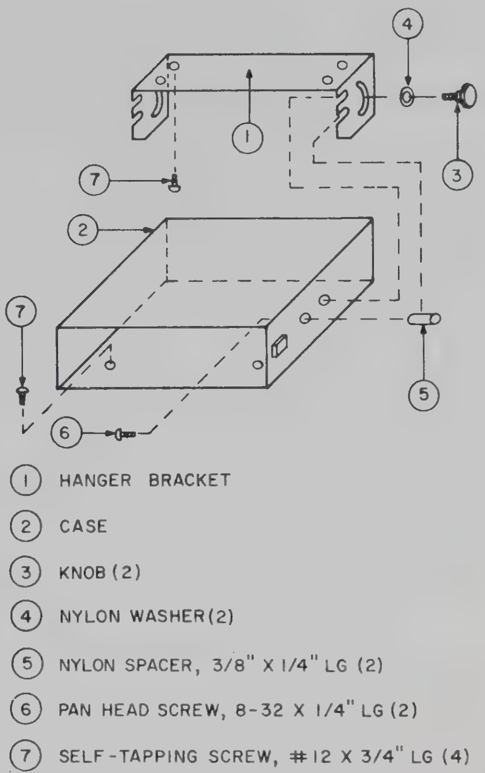
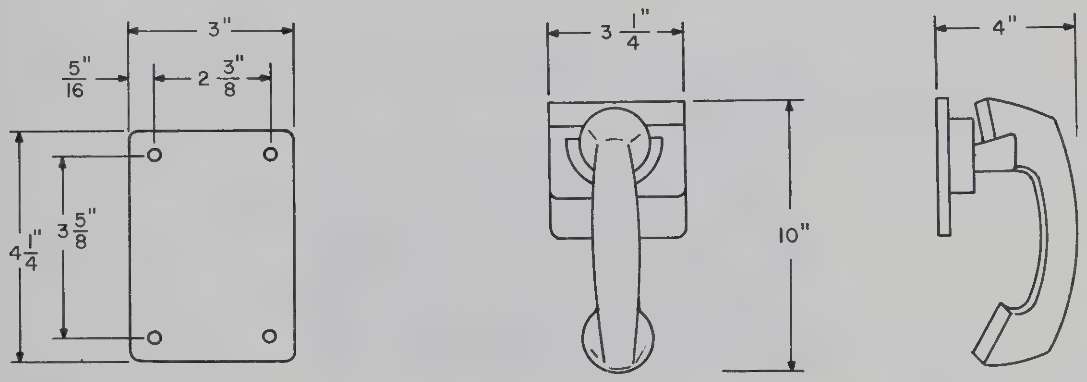
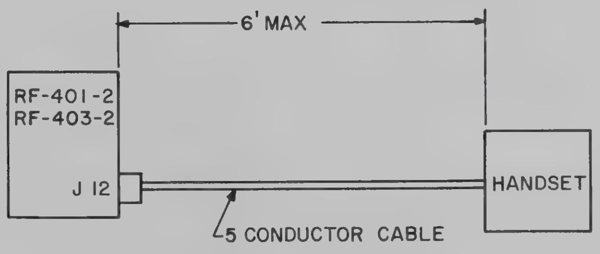

④
①
⑦
③
②
⑦
⑤
⑥
① HANGER BRACKET
② CASE
③ KNOB (2)
④ NYLON WASHER (2)
⑤ NYLON SPACER, 3/8" X 1/4" LG (2)
⑥ PAN HEAD SCREW, 8-32 X 1/4" LG (2)
⑦ SELF-TAPPING SCREW, #12 X 3/4" LG (4)

FIGURE 1.2 - MECHANICAL ASSEMBLY AND INSTALLATION DIAGRAM



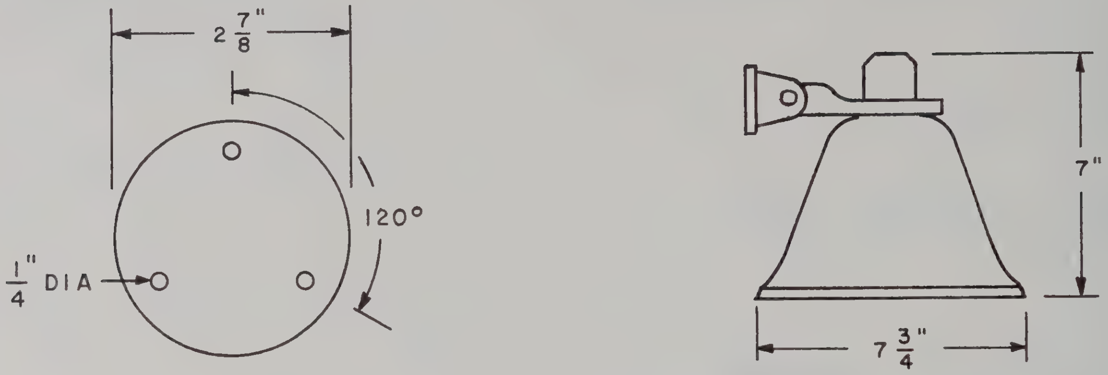
(A) MOUNTING HOLE DIMENSIONS

(B) OVERALL DIMENSIONS

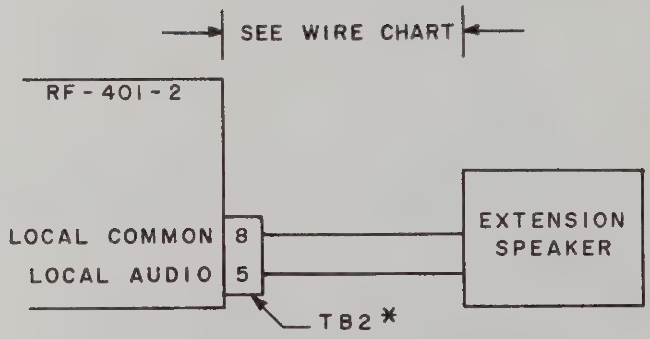


(C) ELECTRICAL CONNECTION

FIGURE 1.3 - HANDSET AND HANGER INSTALLATION DIAGRAM



(A) MOUNTING DIMENSIONS

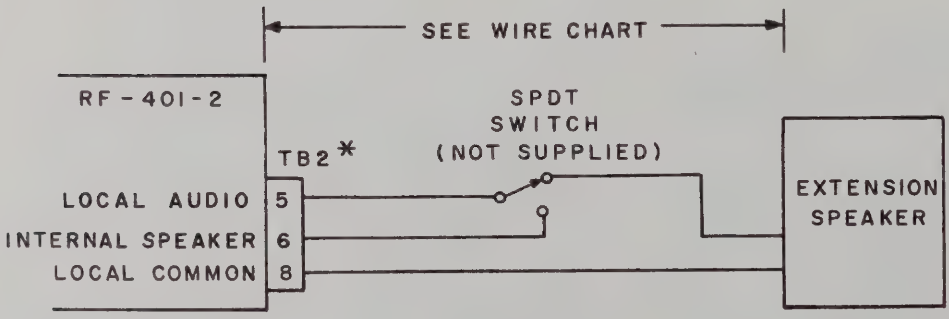


* REMOVE JUMPER WIRE CONNECTED BETWEEN TERMINALS 5 AND 6 ON TB2 ON RF-401 REAR PANEL

WIRE CHART

WIRE SIZE (AWG)	LENGTH OF RUN (FT)
18	UP TO 35
16	35 TO 55
14	55 TO 90
12	OVER 90

(B) STANDARD ELECTRICAL CONNECTION DIAGRAM



* SEE ABOVE

(C) OPTIONAL ELECTRICAL CONNECTION DIAGRAM

FIGURE 1.4 - EXTENSION SPEAKER INSTALLATION DIAGRAM

1.3 TRANSCEIVER ELECTRICAL CONNECTIONS

The transceiver is designed to be operated from either a positive or negative ground dc primary power source. It is important that the positive side of the primary power source is connected to the + (plus) terminal of TB1 and that the negative side is connected to the - (minus) terminal of the TB1 (see figure 1.5). If the primary power leads are reversed, fuse F1 will be opened when power is applied to the transceiver.

Primary power cables are supplied in the ancillary kit for use in the marine, aircraft, and mobile installations. These cables have lugs attached at one end for connection to the transceiver. For fixed installations, use a number 8 AWG cable for distances up to 20 feet from the primary power source. For distances of up to 35 feet, it is suggested that a number 6 AWG cable be used.

The shorting bar, supplied with the ancillary kit should be used to connect the primary power return line to chassis ground at the transceiver rear panel.

A fuse block and primary power fuse (see table 1.1) are supplied with the ancillary kit. This fuse block can be used if a fuse block is not already installed or if there are no extra circuits on the existing fuse block. The primary power fuse must be in series with the hot (ungrounded) line.

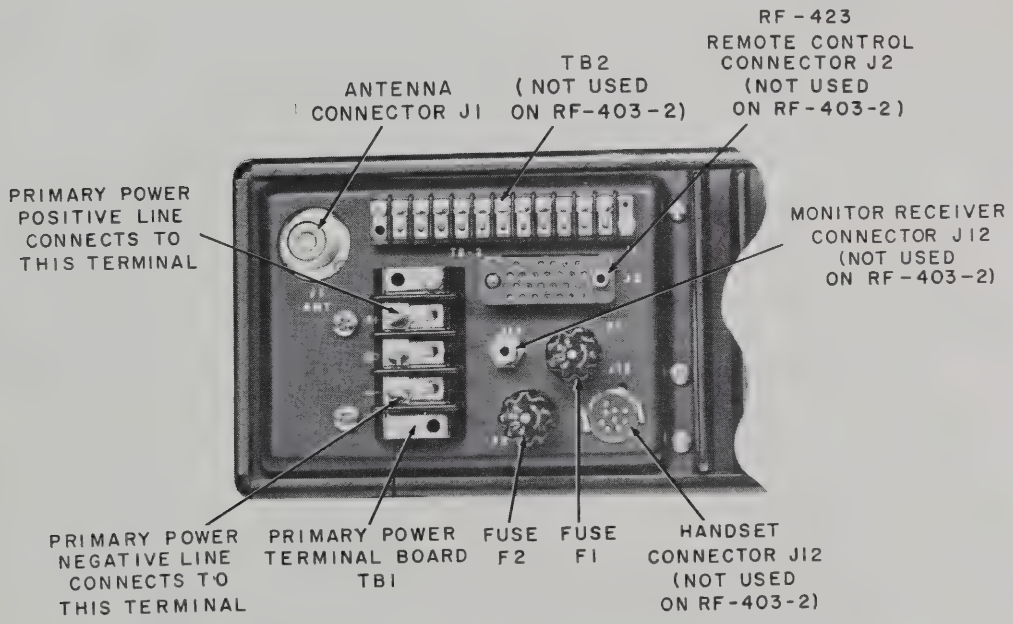


FIGURE 1.5 - TRANSCEIVER REAR PANEL (PARTIAL VIEW)

TABLE 1.1 TRANSCEIVER PRIMARY POWER FUSES

TRANSCEIVER MODEL NUMBER	PRIMARY VOLTAGE	FUSE (QUICK ACTING)
RF-401-2	13.6 vdc	25 amps
RF-403-2	13.6 vdc	25 amps
RF-404-3	27.5 vdc	10 amps

1.4 INITIAL ADJUSTMENTS

After the transceiver has been installed, the following items must be checked and adjusted, as required: transmitter frequency; deviation; dc input to the power amplifier. For check and adjustment procedures, refer to table 4.14 for transmitter frequency, table 4.13 for deviation, and table 4.11 for tuning the power amplifier into the antenna.

CHAPTER 2

OPERATION

2.1 OPERATING INSTRUCTIONS

The following operating instructions pertain to marine, mobile and fixed installations. For aircraft installations, refer to instruction Manual IM-0201 to operate the transceiver from the RF-423 Remote Control.

Note

> Step a applies to marine transceivers only. The remaining steps apply to all transceivers except aircraft.

a) On marine transceiver, set CONTROL switch at LOCAL, SPEAKER switch at ON and LIGHT switch at desired illumination level.

b) Rotate VOLUME control out of OFF (detent) position to apply power to transceiver and set at desired listening level.

c) Set SQUELCH control at desired squelch level. Maximum counterclockwise position provides maximum squelch.

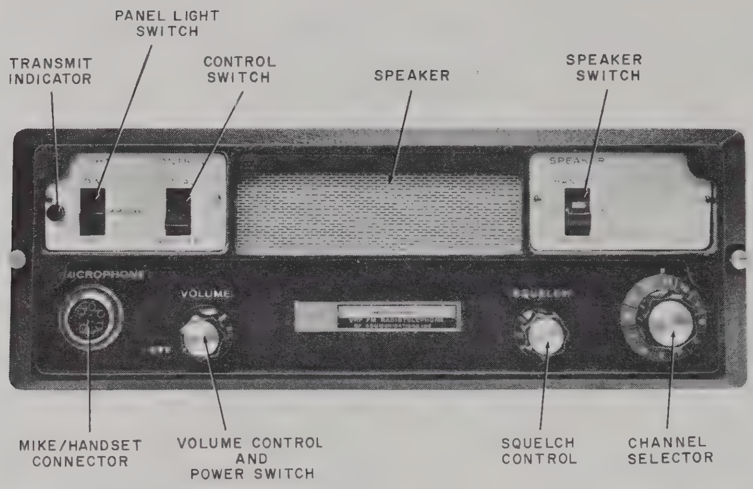
d) Set channel selector switch at desired channel.

e) To transmit, depress push-to-talk switch and speak into microphone. Observe that red transmit indicator, on transceiver front panel, illuminates when push-to-talk switch is depressed. At end of transmission, release the push-to-talk switch. Received audio signals will be applied to either the transceiver front panel speaker or handset earpiece.

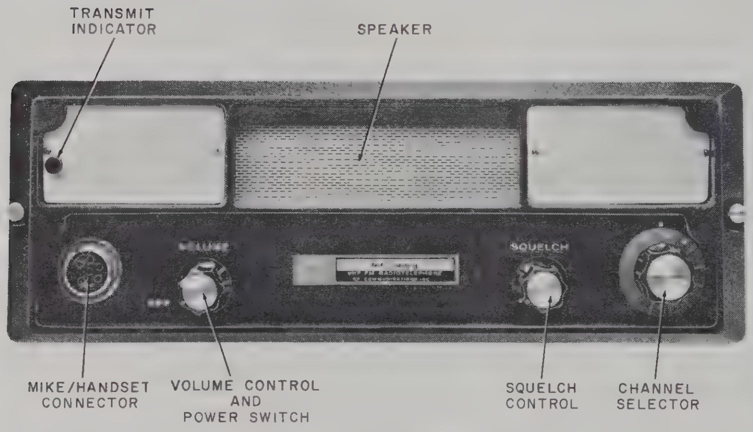
Note

> When handset is placed in the hanger, received audio signals will be applied to the transceiver front panel speaker.

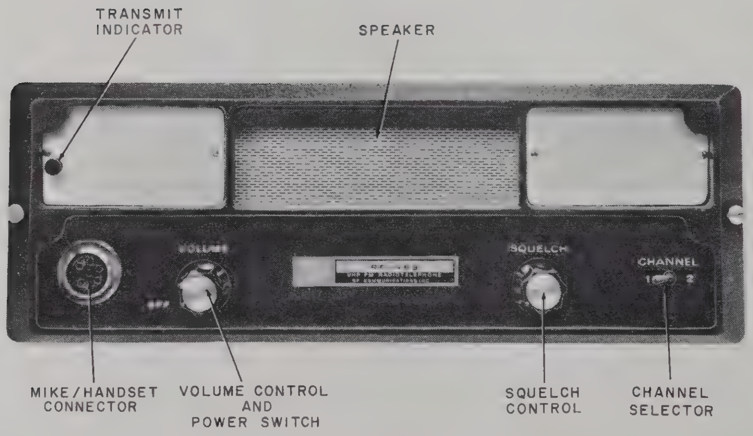
f) To turn off the transceiver, rotate the VOLUME control fully counterclockwise into the OFF (detent) position.



(A) RF-401-2 AND RF-404-3



(B) RF-403-2 (4-CHANNEL)



(C) RF-403-2 (2-CHANNEL)

FIGURE 2.1 - TRANSCEIVER OPERATING CONTROLS AND INDICATORS

TABLE 2.1 - OPERATING CONTROLS, INDICATORS AND CONNECTORS

CONTROL, INDICATOR OR CONNECTOR	FUNCTION
VOLUME control	Applies primary power when rotated out of detent position and controls audio signal level applied to front panel speaker, external speaker or handset.
SQUELCH control	Controls squelch sensitivity.
LIGHT switch (RF-401-2 and RF-404-3 only)	Three-position rocker switch. DIM - Provides low-level front panel illumination. BRIGHT - Provides high-level front panel illumination. OFF - Front panel is not illuminated. Provides minimum power drain when monitoring.
CONTROL switch (RF-401-2 and RF-404-3 only)	Two-position rocker switch. LOCAL - Operation is from receiver front panel. REMOTE - Operation is from RF-423 Remote Control.
SPEAKER switch (RF-401-2 and RF-404-3 only)	Three-position rocker switch. HANDSET - Front panel speaker is disabled for conversation privacy when handset is removed from hanger. ON - Receive audio signals are applied to front panel speaker even when handset is removed from hanger. RINGER - Front panel speaker is disabled and audio is applied to selective ringer (not supplied).
Channel Selector	Selects desired channel.
MICROPHONE connector	Used for connecting microphone or handset to the transceiver.
Transmit indicator	Illuminates when transmitter is keyed.

CHAPTER 3

PRINCIPLES OF OPERATION

3.1 GENERAL

The transceiver employs a phase-modulated FM transmitter and dual-conversion superheterodyne receiver on a common chassis. Depending upon the particular transceiver (see specifications) operation is on any one of up to twelve crystal-controlled channels in the frequency range of 132 to 174 MHz.

With the exception of the power amplifier, all circuitry utilizes solid-state components. The power amplifier uses a type 8509 instant-heating vacuum tube. A self-contained power supply provides the necessary operating voltages. Depending upon the power supply, the transceiver can operate from one of two primary voltage sources: 13.6 or 27.5 vdc.

3.2 RECEIVE CIRCUITS

The receiver portion consists of receiver assembly A1, part of oscillator assembly A3, multiplier assembly A7 and associated circuitry.

The rf signals from the antenna are applied through the antenna low-pass filter and a pair of de-energized contacts of T/R relay K1 to receiver assembly A1 (figures 3.1 and 4.9 through 4.11).

Receiver assembly A1 (paragraph 3.4) contains the necessary circuitry to extract the audio information from the received rf signal. Two stages of audio amplification are used to raise the audio signal to a level suitable for driving the front panel speaker, extension speaker or handset earpiece.

The receive injection frequency oscillator, located on oscillator assembly A3 (paragraph 3.6) supplies a crystal-controlled injection frequency to receiver assembly A1 through multiplier assembly A7. The receive injection frequency oscillator is controlled by ground, applied through Channel Selector switch S4, and by +10 vdc, developed on receiver assembly A1, applied through a pair of de-energized contacts of T/R relay K1.

3.3 TRANSMIT CIRCUITS

The transmitter portion consists of exciter assembly A2, PA assembly A4, part of oscillator assembly A3 and associated circuitry. Audio signals from the microphone or handset are applied from front panel connector J3 to the input of exciter assembly A2 (figures 3.1 and 4.9 through 4.11). Exciter assembly A2 (paragraph 3.5) contains the necessary circuits for converting the audio signals into a phase-modulated rf signal. The rf output of exciter assembly A2 is amplified by PA assembly A4, the output of which is applied through a pair of energized contacts on T/R relay K1 and the antenna low-pass filter to the antenna.

Transmit/receive relay K1 is controlled by the microphone or handset push-to-talk switch and is energized in the transmit mode.

The antenna low-pass filter is used for harmonic suppression and attenuates signals above 190 MHz.

3.4 RECEIVER ASSEMBLY A1

The received rf signals applied to receiver assembly A1 are amplified by two stages of rf amplification (Q1 and Q2) and applied to first mixer Q3 (figures 3.2 and 4.12).

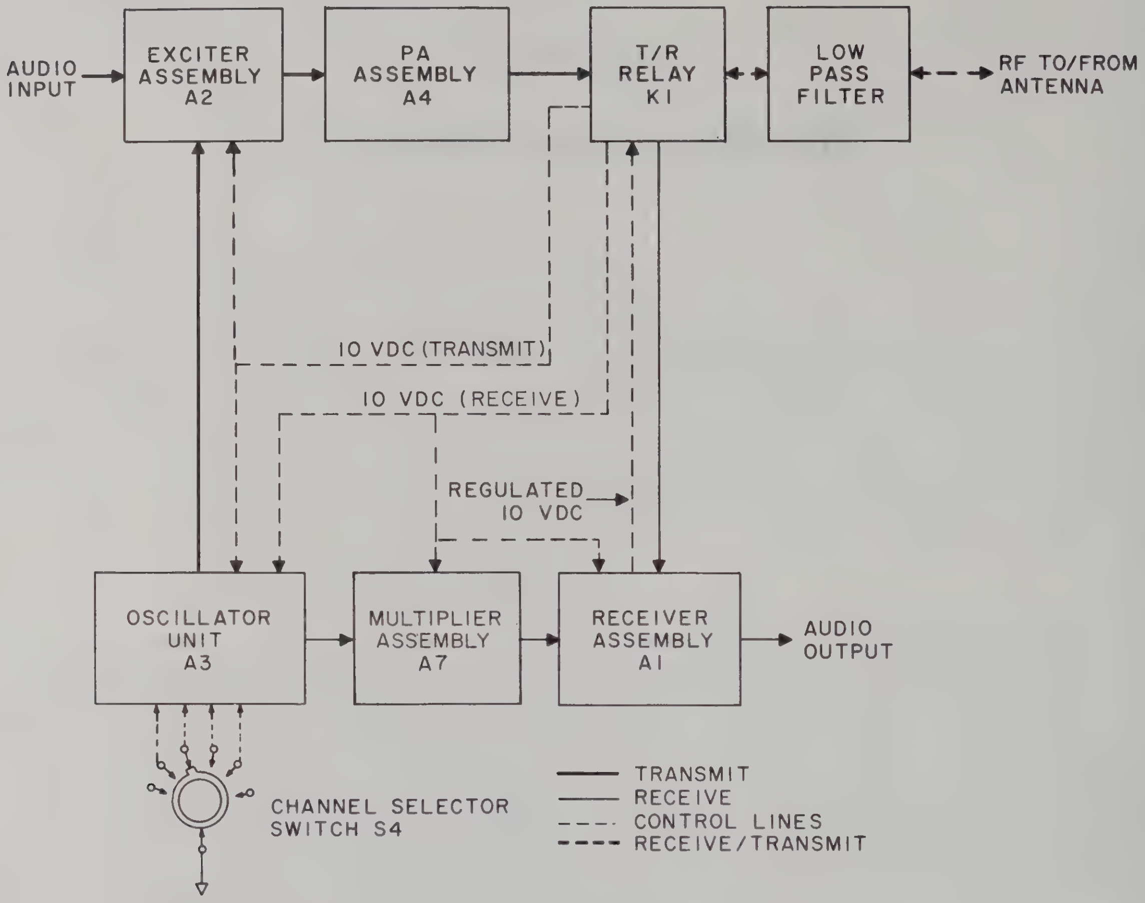


FIGURE 3.1 - TRANSCEIVER BLOCK DIAGRAM

The amplified rf signal applied to first mixer Q3 is mixed with an injection frequency supplied by oscillator assembly A3 (paragraph 3.6) through multiplier assembly A7 (paragraph 3.8).

First mixer Q3 mixes the amplified rf signal, 141 MHz nominal, and the injection frequency, 121 MHz nominal. The difference frequency output of first mixer Q3, 20 MHz, is applied to second mixer Q10 through 20 MHz crystal filter FL1 and two stages of rf amplification (Q7 and Q8).

The 20 MHz signal applied to second mixer Q10 is mixed with a second injection frequency, 20.455 MHz, generated by crystal oscillator Q9. The difference frequency output of second mixer Q10, 455 kHz, is applied to IC1, an integrated circuit.

Integrated circuit IC1, performs the function of a two-stage 455 kHz IF amplifier with a single stage of limiting at the output.

The 455 kHz IF output of IC1 is applied to a Foster-Seeley type discriminator that detects the audio intelligence contained in the 455 kHz IF. The audio intelligence is applied to buffer amplifier Q11, the output of which is applied to the first stage of audio amplification and the noise squelch circuit.

Buffer amplifier Q11 isolates the discriminator stage from the following stages, thus preventing the discriminator from being overloaded.

There are two stages of audio amplification. The first stage of audio amplification, IC2, is

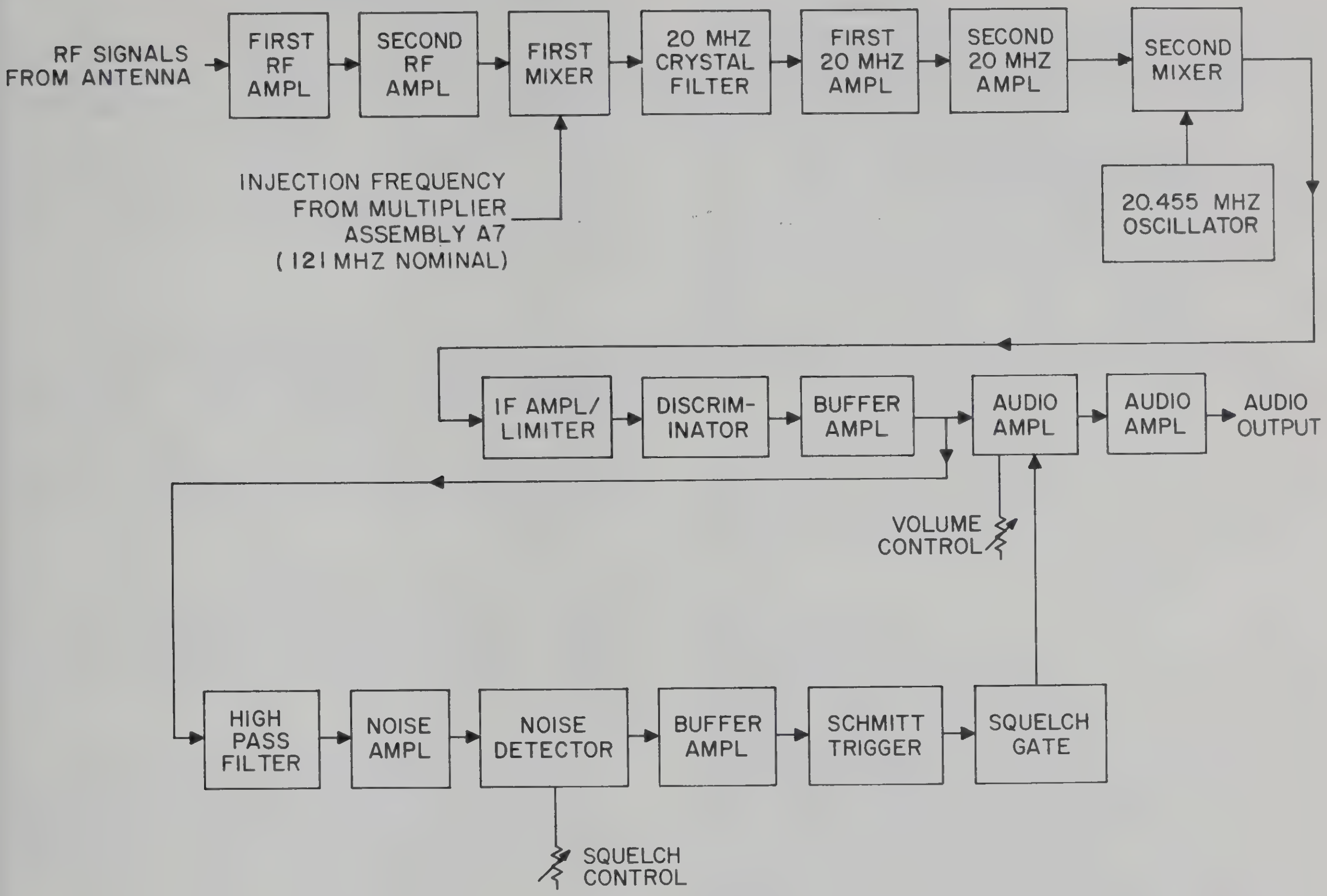


FIGURE 3.2 - RECEIVER ASSEMBLY A1, BLOCK DIAGRAM

an integrated circuit that performs three functions: 1) pre-amplification, 2) variable audio gain, and 3) signal gating. Variable audio gain is obtained by applying an adjustable dc voltage from the wiper of VOLUME control R3 to IC2. The gating effect is obtained by completion of a dc path to common through squelch gate Q6. The output of IC2 is applied to the second stage of audio amplification.

The second stage of audio amplification is a complimentary symmetry amplifier, Q22 through Q27, enabled by application of either 12 or 24 volts dc through a pair of de-energized contacts of T/R relay K1 (figures 4.9 through 4.11) during receive. This circuit is capable of delivering 4 watts of audio power, through coupling capacitor C13, to the front panel speaker or extension speaker and 80 mw to the handset earpiece.

The squelch circuit is formed by a high-pass filter, noise amplifier Q15, noise detector CR5, CR6, buffer amplifier Q16, Schmitt Trigger Q17, Q18 and squelch gate Q6. It operates by detecting the effect the carrier has on the noise output of the discriminator.

In the absence of a carrier signal, maximum audio noise is present (300 Hz to approximately 10 kHz). This noise level is reduced when a carrier signal of the correct frequency is present at the antenna terminal. The squelch circuit detects this variation of noise level and causes the audio output to be gated through to the speaker, etc. In the absence of a carrier signal, the receiver is returned to the muted state. The sensitivity of the squelch circuit to the rf input signal is determined by the setting of SQUELCH control R4.

In the absence of a carrier signal, the noise output of buffer amplifier Q11 is applied to the high pass filter formed by capacitors C70, C71, C74 and inductor L21. This filter attenuates any voice signals (300 Hz to 3 kHz) allowing only the high frequency noise to be applied to the squelch circuit. The filter output is amplified by Q15 and detected by the noise detector, CR5, CR6. The resultant negative going output is applied to the Schmitt Trigger, Q17, Q18 through buffer amplifier Q16.

Buffer amplifier Q16 provides isolation between the noise detector and Schmitt Trigger to prevent the Schmitt Trigger from overloading the detector.

Transistors Q17 and Q18 form a Schmitt Trigger circuit. With a negative going signal applied to the base of transistor Q17, transistor Q17 will be turned off. With transistor Q17 turned off, transistor Q18 will be turned on. With the Schmitt Trigger in this condition (Q17 off, Q18 on), squelch gate Q6 will be turned off, thus disabling the first stage of audio amplification. The triggering action is rapid and positive thus preventing partial squelching action.

With a carrier signal present, there is no output from noise detector CR5, CR6. In this condition, the state of the Schmitt Trigger is reversed; transistor Q17 is turned on, and transistor Q18 is turned off. With transistor Q18 turned off, squelch gate Q6 is turned on, thus enabling the first stage of audio amplification.

The +10 vdc regulator, formed by transistors Q19, Q20 and Q21, supplies a regulated +10 vdc used on receiver assembly A1, exciter assembly A2, oscillator assembly A3, and multiplier assembly A7. The regulated +10 vdc is applied to receiver assembly A1, oscillator assembly A3 and multiplier assembly A7 (in the receive mode) through a pair of contacts on T/R relay K1.

3.5 EXCITER ASSEMBLY A2

Audio signals from either the microphone or handset are applied to mike amplifier Q1, the output of which is applied to the speech clipper stage formed by diodes CR2 and CR3 (figures 3.3 and 4.13).

The speech clipper stage provides a symmetrical clipping of the applied audio signal. This clipping action increases the average power of the modulating signal. The output signal is applied to the active low-pass filter network formed by emitter follower Q2 and associated circuitry.

The filter provides post-limiter roll-off. The filter output is applied to amplifier Q3, the output of which is applied to the phase modulator.

Deviation Adjust control, R16, in the collector circuit of Q3 is used to adjust the transmitter deviation by controlling the level of the audio drive signal applied to the modulator.

The phase modulator consists of varactors CR4, CR5 and tuned inductors L1, L2. The applied audio drive signal varies the capacitance of the varactors that phase modulates the 11.75 MHz (nominal) injection frequency. The injection frequency is generated by the transmit oscillator located on oscillator assembly A3 (paragraph 3.6). The phase modulator output, essentially an FM signal with a pre-emphasis characteristic, is applied to three class C amplifiers, used as multipliers; one tripler and two doublers.

Tripler Q4 produces a 35.25 MHz nominal output that is applied to doubler Q5 through a tuned tank formed by inductors L3, L4. These inductors are tuned to three times the crystal frequency.

Doubler Q5 produces an output of 70.50 MHz (nominal) that is applied to a second doubler

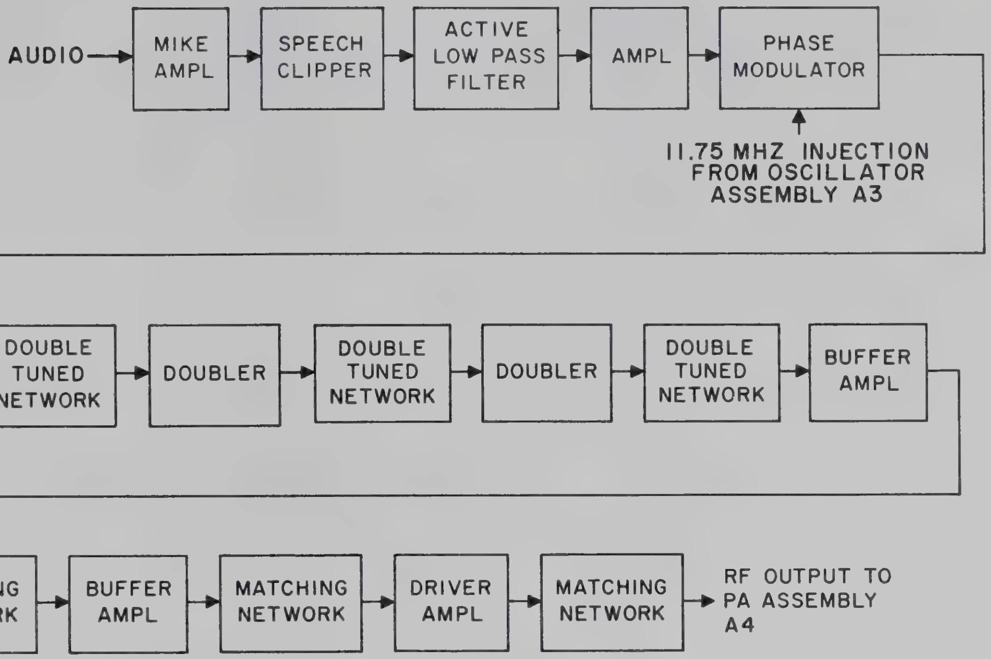


FIGURE 3.3 - EXCITER ASSEMBLY A2, BLOCK DIAGRAM

Q6, through another tuned tank formed by inductors L5, L6. These inductors are tuned to six times the crystal frequency.

Doubler Q6 produces an output of 141 MHz (nominal) that is successively amplified by amplifiers Q7, Q8 and driver amplifier Q9. The output of doubler Q6 is applied to amplifier Q7 through a tuned tank formed by inductors L7, L8 that are tuned to 12 times the crystal frequency. The output of driver amplifier Q9 is coupled to power amplifier assembly A4.

3.6 OSCILLATOR ASSEMBLY A3

Oscillator assembly A3 contains the necessary circuits for generating the crystal-controlled receive and transmit injection frequencies. Depending upon the particular transceiver, up to three oscillator assemblies are used, with each assembly providing four channels with the exception of the fixed-installation transceiver that uses a two-channel oscillator assembly. The oscillator assembly contains two oscillators, two buffer amplifiers, and one receive and one transmit crystal for each active channel.

In the receive mode, regulated 10 vdc (from receiver assembly A1) is applied to oscillator Q1 and amplifier Q2 (figures 3.4 and 4.14), through a pair of contacts on T/R relay K1. Ground is applied through Channel Selector switch S4 to one side of a diode gate located in the base circuit of oscillator Q1. With ground applied, the diode gate is forward biased, thus connecting its associated crystal into the base circuit of oscillator Q1. The oscillator output is amplified by Q2, the output of which is applied to multiplier assembly A7. Amplifier Q2 also acts as a buffer to prevent the multiplier circuits on multiplier assembly A7 from loading the oscillator.

In the transmit mode, the regulated 10 vdc is switched by T/R relay K1 to oscillator Q3 and amplifier Q4. Oscillator Q3 is enabled, in the transmit mode, in the same manner as oscillator Q1 is enabled in the receive mode. The output of amplifier Q4 is applied to the phase modulator on exciter assembly A2.

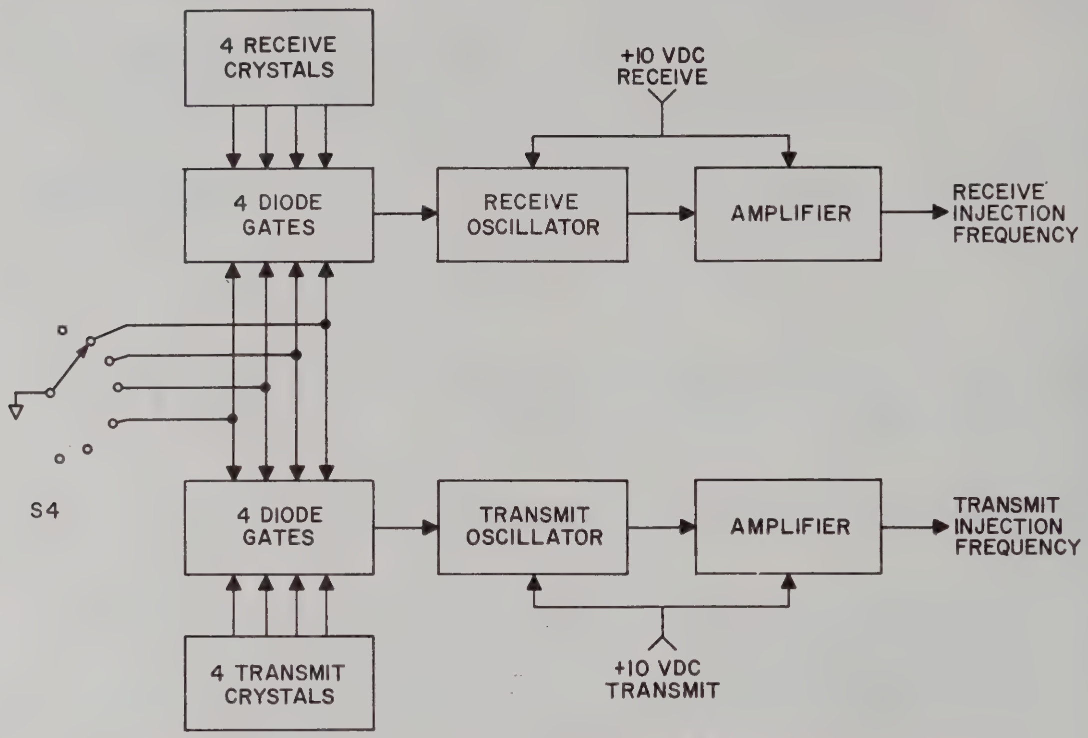


FIGURE 3.4 - OSCILLATOR ASSEMBLY A3, BLOCK DIAGRAM

3.7 POWER AMPLIFIER ASSEMBLY A4

Power amplifier V1 is a class C push-pull amplifier with link coupling in both input and output circuits (figure 4.15). Grid bias is applied to the center tap of the input link secondary winding. Plate voltage is applied to the center tap of the output link primary winding. Variable capacitor A4A1C5 (PA GRID TUNE) connected across the input link secondary winding (located on PA grid board A4A1) is used to tune the grid circuit. Variable capacitor A4A2C1 (PA PLATE TUNE) connected across the output link primary winding (located on capacitor/coil board A4A2) is used to tune the plate circuit. Variable capacitor C5 (ANTENNA LOAD) in series with the output link secondary winding is used to load the antenna circuit.

From the output link secondary winding, the amplified rf signal is applied to the antenna through transmit/receive relay K1 and the antenna low-pass filter.

The plate and control grid voltages are applied directly to power amplifier V1 from the rectifier/filter assembly (paragraph 3.9). The screen grid voltage, also developed on the rectifier/filter assembly, is applied through TUNE/OPERATE switch S2 and T/R relay K1 to power amplifier V1 (figures 4.9 through 4.11). Filament voltage for power amplifier V1 is supplied directly from the dc/ac inverter assembly (paragraph 3.10).

3.8 MULTIPLIER ASSEMBLY A7

The injection frequency supplied by oscillator assembly A3, a nominal 15.125 MHz, is applied to two class C amplifiers used as multipliers (figures 3.5 and 4.14). First multiplier Q1 is a frequency quadrupler and produces an output of 60.5 MHz, nominal. The output of the first multiplier is applied to second multiplier Q2 through a triple-tuned network.

Second multiplier Q2 is a frequency doubler and produces an output of 121 MHz, nominal.

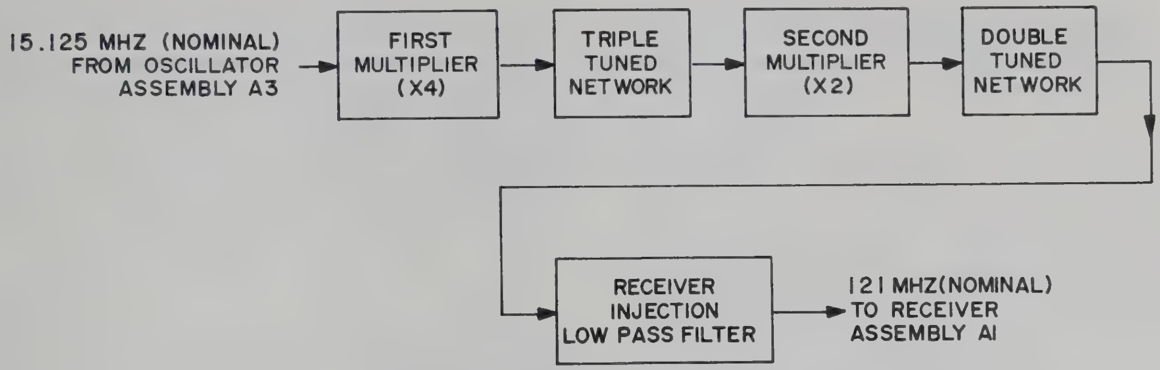


FIGURE 3.5 - MULTIPLIER ASSEMBLY A7, BLOCK DIAGRAM

The output of second multiplier Q2 is applied to first mixer Q3 on receiver assembly A1 through a double-tuned network and the receiver injection low-pass filter.

3.9 RECTIFIER/FILTER ASSEMBLIES

3.9.1 RF–403–2 Rectifier/Filter Assembly A5

Used in the RF-403-2 transceiver, rectifier/filter assembly A5 (figure 4.16) contains two full-wave bridge rectifiers and one half-wave rectifier, that convert the applied ac voltages, from dc/ac inverter A8, into the required dc operating voltages.

The full-wave bridge rectifier, consisting of diodes CR1 through CR4, in conjunction with the full-wave bridge rectifier consisting of diodes CR5 through CR8, supplies the plate voltage for power amplifier A4V1. The full-wave bridge rectifier consisting of diodes CR5 through CR8 also provides the screen voltage for power amplifier A4V1 and half-wave rectifier, CR9, supplies the control grid bias.

3.9.2 RF–401–2 and RF–404–3 Rectifier/Filter Assemblies A5 and A6

Used in the RF-401-2 and RF-404-3 transceivers, rectifier/filter assemblies A5 and A6 (figure 4.17) convert the applied square-wave ac voltages, from dc/ac inverter A8, into the required dc operating voltages.

Assembly A5 contains two full-wave birdge rectifiers and one half-wave diode rectifier. The full-wave bridge rectifier, consisting of diodes CR1 through CR4, in conjunction with the full-wave bridge rectifier consisting of diodes CR5 through CR8, supplies the plate voltage for power amplifier A4V1. The full-wave bridge rectifier consisting of diodes CR5 through CR8 supplies the screen grid voltage for power amplifier A4V1. Half-wave rectifier, diode CR9, supplies the control grid bias voltage for power amplifier A4V1.

Assembly A6 contains a full-wave bridge rectifier, consisting of diodes CR1 through CR4 and a capacitive input pi-type filter, and provides +12 vdc transmit for exciter assembly A2 in the RF-404-3 transceiver.

3.10 DC/AC INVERTER A8

The dc/ac inverter, A8, used in the RF-401-2 and RF-403-2 transceivers, changes the 13.6 vdc primary voltage into a square-wave ac voltage (figure 4.19) while the dc/ac inverter used in the RF-404-3 transceiver changes the 27.5 vdc primary voltage into a square-wave ac voltage (figure 4.20). The outputs of both inverters are applied to the rectifier/filter assemblies (paragraph 3.9) and, irregardless of the primary voltage, operate in the same manner.

When primary power is applied, the two transistors will conduct (figures 4.19 and 4.20).

Due to electrical characteristics of the transistors, one transistor will conduct more heavily than the other.

As the current flow increases, a voltage is induced in the transformer (A1T1) winding connected to the bases of the two transistors. The polarity of the induced voltage is such that one transistor will be driven towards saturation and the other transistor will be driven towards cut-off. The current will continue to increase until the transformer becomes saturated. At this time, the induced voltage drops towards zero and there is no longer enough base bias to maintain collector current. When this happens, the current starts to decrease, causing a voltage to be induced of opposite polarity, driving the transistor previously turned off towards saturation and driving the previously saturated transistor towards cut-off. This switching action produces a square wave output that is applied to the rectifier/ filter assemblies through power transformer T1.

Reverse polarity protection is provided by diode CR1. With the correct polarity applied at the primary input, diode CR1 will be reversed biased. When the polarity is reversed, diode CR1 becomes forward biased, allowing an excessive amount of current to flow through fuse F1. When this happens, fuse F1 will open, instantaneously, thus preventing any damage to occur to the circuit components.

CHAPTER 4

MAINTENANCE

4.1 MAINTENANCE OF SOLID STATE EQUIPMENT

Due to the widespread application of semiconductor devices and printed circuit boards in the transceiver, some deviation from normal servicing practices is required. The special practices recommended in this paragraph should facilitate testing and parts replacement and prevent damage to components.

4.1.1 Testing

In solid state circuits, the impedances and resistances encountered are of much lower values than those encountered in vacuum tube circuits. A difference of a few ohms can greatly affect the performance of the equipment. Also, coupling and filter capacitors require larger values and are usually of the low voltage electrolytic type. Therefore, when measuring low resistances, use an instrument that is very accurate in the low resistance ranges.

WARNING

> Since solid state devices may be quickly damaged by excess voltage or current, be sure the ohmmeter used uses batteries less than 7.5 for resistance measurements.

Transistors can usually be checked in the circuit. Using a 20,000 ohms/volt dc voltmeter, check the voltages on each element of the transistor. If the dc voltage is considerably different from that indicated in the voltage measurement chart, check each detail of the circuit for faults. If there are no obvious faults, the transistor, itself, may be defective. Most significant of the dc voltages is the emitter voltage, since in the common emitter circuit, the voltage across the emitter resistor is a good indicator of the dc operating conditions of the stage. In most cases, the difference between the emitter and base voltages should be approximately 0.6 to 0.7 volts.

Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage; therefore, a short or open circuit in the biasing circuit may damage the transistor. A transistor can also be checked out of the circuit as follows, using a sensitive ohmmeter with a low voltage circuit. To check a PNP transistor, connect the positive lead of the ohmmeter to the base of the transistor; connect the negative lead to the emitter and then to the collector. Generally, a resistance reading of 100,000 ohms or more should be obtained between emitter and base or between emitter and collector. Reconnect the meter with the negative lead to the base and the positive lead connected to the emitter. A resistance value of 500 ohms or less should be obtained. When the positive lead is connexted to the collector, a value of 500 ohms or less should be obtained. With the positive lead on the collector and the negative lead on the emitter, the resistance should be high.

Similar tests made on an NPN transistor produce the following results. With the negative lead on the base and the positive lead on the emitter or collector, the resistance should be high. With the positive lead on the base and the negative lead on the emitter or collector, the resistance should be low. With the negative lead on the collector and the positive lead on the emitter, the resistance should be high.

CAUTION

> If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short exists in the circuit, putting in another transistor will most likely result in damaging the new transistor. Do not depend upon fuses to protect transistors. Never remove or replace a semiconductor device with the voltage applied. Transients thus produced can damage them.

Diodes can be checked with an ohmmeter in much the same way as transistors. In the forward direction, the resistance measured should be low; in the reverse direction, the resistance should be very high.

4.1.2 Tracing Printed Circuits

Special composite illustrations of printed circuit boards are provided. These show the board from the component side with the wiring side shown in phantom. Components are identified by schematic reference designators. These illustrations are of particular assistance in tracing circuits on boards which the wiring side is not accessible.

Circuit tracing can be done from either side of the board. Usually, the easiest method is to place a small light behind the board, so that connection points can be seen through the board, and then testing on the component side. Eyelet and wire connections identified both in the assembly view and on the schematic are usually good points to check first, since they are easy to identify and to reach

4.1.3 Replacing Components

Use only a low-heat soldering iron when installing or removing soldered-in parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clean excess solder from mounting eyelets, making sure that mounting holes are clear before installing the new part. When removing a transformer or other part having a multiple number of leads, straighten all leads first and then heat leads one at a time, working around the part, until the part can be gently rocked out. A solder sucker will greatly simplify removal of multiple lead components.

Note

> A toothpick can be used to clear molten solder from holes.

When installing or removing a soldered-in semiconductor, grasp the lead to which heat is being applied, between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise be conducted into the semiconductor device from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be make quickly. Excessive heat will permanently damage a semiconductor.

If the copper-foil wiring is damaged, a piece of small buss wire can be used to bridge the gap. It is seldom necessary to replace a board because of foil breakage.

Capacitors, resistors, and other two-lead components can be replaced without removing the old leads, using the following procedure. This method is not as good as removing old leads, but sometimes it can be used to advantage if access to the printed side of the board is impractical.

a) Cut the component in half with diagonal cutters.

b) Crush the remains of the component, and break the pieces away from the leads. This will provide maximum lead length.

c) Bend the leads close to the board to form a loop.

d) Connect the leads of the new component to the loops formed by the old leads, and solder the connections. Be careful to dress the leads so they don't contact nearby leads.

4.2 TEST EQUIPMENT

The following is a list of test equipment required to properly service the transceiver.

VOM, Simpson Model 260 or equivalent

RF Signal Generator, Hewlett-Packard HP-606A or equivalent

Carrier Deviation Meter, Marconi TF-791D or equivalent

Audio Signal Generator, Hewlett-Packard HP-200AB or equivalent

RF Voltmeter, Boonton 91CA or equivalent

Frequency Counter, Hewlett-Packard 5242L or equivalent

Wattmeter, Micro-Match 711N or equivalent

Dummy Load, 50-ohm, 75-watt

FM Signal Generator, Marconi Type TF-1066B/I or equivalent

Distortion Analyzer, Hewlett-Packard HP-331A or equivalent

4.3 PREVENTIVE MAINTENANCE

Preventive maintenance checks contained in table 4.1 should be performed at regular intervals to ensure proper operation.

4.4 TROUBLESHOOTING PROCEDURES

Table 4.2 contains troubleshooting procedures that can be used as a guide for isolating faults to a particular board or assembly in the transceiver.

4.5 ALIGNMENT PROCEDURES

Complete alignment procedures, tuning adjustments and performance checks are contained in tables 4.3 through 4.13.

TABLE 4.1 - PREVENTIVE MAINTENANCE CHECKS

PREVENTIVE MAINTENANCE CHECK	INTERVAL
1. Check all exterior cables for proper connection. Also check all cables for any signs of damage.	3 months
2. Check primary voltage generating system for proper operation.	As required
3. Keep antenna and antenna base free of dirt and corrosion.	As required
4. Check transmitter frequency and deviation.	12 months
5. Check power input to final	12 months
6. Check receiver frequency.	12 months

TABLE 4.2 - TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	PROCEDURE
1. Set completely dead.	a. No primary supply voltage.	a. Check for correct primary supply voltage.
	b. Primary power fuse open.	b. Replace, if defective, and check primary circuit for possible short circuit.
	c. Faulty power switch.	c. Check switch for proper operation, and replace if defective.
2. No transmit or receive signals on all channels.	a. Faulty dc/ac inverter.	a. Make V/R check, figure 4.19 or 4.20.
	b. Faulty rectifier/filter assembly.	b. Make V/R check, figure 4.16 or 4.17.
	c. Faulty +10 vdc regulator on receiver assembly.	c. Make V/R check, figure 4.12.
	d. Faulty oscillator assembly.	d. Make V/R check, figure 4.14.
	e. Faulty antenna circuit.	e. Check antenna circuit to set.
	f. Faulty antenna low pass filter.	f. Check antenna low pass filter, figures 4.5, 4.9 through 4.11.
	g. Faulty exciter assembly.	g. Make V/R check, figure 4.13.
	h. Faulty receiver assembly.	h. Make V/R check, figure 4.12.

TABLE 4.2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
3. No transmitted signals, receive signals present.	a. Faulty relay K1 or K2.	a. Check relay K1 and K2 for proper operation. Replace if defective.
	b. Faulty push-to-talk switch on handset or microphone.	b. Check push-to-talk switch for proper operation. Replace or repair as required.
	c. Faulty rectifier/filter assembly.	c. Make V/R check, figure 4.16 or 4.17.
	d. Broken connection on Channel Selector switch S4.	d. Check Channel Selector switch S4. Repair as required.
	e. Exciter assembly inoperative.	e. Make V/R check, figure 4.13. Replace defective component. Realign exciter assembly, table 4.10. If driver current is excessively high or low, check PA assembly before checking exciter assembly.
	f. Faulty PA assembly.	f. Make V/R check, figure 4.15.
	g. Defective power amplifier tube V1.	g. Check power amplifier tube V1. Replace if defective. Retune PA assembly, table 4.11.
4. Transmitter inoperative on one channel, all other channels operative in transmit and receive.	a. No injection frequency from oscillator assembly.	a. Check oscillator selection circuit and crystal associated with inoperative channel. Repair as required and readjust frequency, table 4.13.

TABLE 4.2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
5. No receive signals, transmitter operative.	a. Faulty T/R relay K1.	a. Check T/R relay K1 for proper operation.
	b. No injection frequency from oscillator assembly.	b. Make V/R check, figure 4.14.
	c. Faulty multiplier assembly.	c. Make V/R check, figure 4.18. Measure stage gain, figure 4.8.
	d. Faulty receiver assembly.	d. Make V/R check, figure 4.12. Measure stage gain, figure 4.7.
	e. Faulty loudspeaker or handset earpiece.	e. Check loudspeaker or handset earpiece.
6. No receive signals on one channel, all other channels operative.	a. No injection frequency from oscillator assembly.	a. Check oscillator selection circuit and crystal associated with inoperative channel. Repair as necessary and readjust frequency, table 4.5.
7. Unmodulated carrier is transmitted.	a. Faulty audio stages on exciter assembly.	a. Make V/R check of audio stages on exciter assembly, figure 4.13.
	b. Faulty microphone or handset.	b. Check microphone or handset and repair as required.

TABLE 4.2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
8. Low rf output power on all channels.	a. Faulty exciter assembly.	a. Make V/R check of rf stages on exciter assembly, figure 4.13. Replace defective component and realign exciter assembly, table 4.10.
	b. Faulty PA assembly.	b. Make V/R check, figure 4.15.
	c. Defective PA tube V1.	c. Check PA tube V1 and replace if defective. Retune PA assembly A4, table 4.11.
	d. Faulty rectifier/filter assembly.	d. Make V/R check, figure 4.16 or 4.17.
9. Low rf output power on one channel, normal on all other channels.	a. Defective oscillator assembly.	a. Make V/R check, figure 4.14.
10. Distorted modulation in transmit.	a. Defective microphone or handset.	a. Check microphone or handset. Repair as required.
	b. Defective exciter assembly.	b. Make V/R check of audio stages on exciter assembly A2, figure 4.13.
	c. Defective oscillator assembly.	c. Check frequency of injection signal for channel being distorted. Repair as necessary. Readjust frequency, table 4.13.

TABLE 4.2 - TROUBLESHOOTING CHART (Cont.)

SYMPTOM	PROBABLE CAUSE	PROCEDURE
11. Received audio signal distorted.	a. Defective oscillator assembly.	a. Check frequency of injection signal for channel producing distortion. Repair as necessary. Readjust frequency, table 4.5.
	b. Faulty multiplier assembly.	b. Make V/R check, figure 4.18. Measure stage gain, figure 4.8.
12. Audio output low.	a. Defective receiver assembly.	a. Make V/R check, figure 4.12. Check receiver gain, figure 4.7.
13. Injection frequency incorrect on one channel, all other channels correct.	a. Crystal trimmer not properly adjusted.	a. Adjust trimmer to set signal at proper frequency, table 4.5 or 4.13.
	b. Crystal out of tolerance.	b. Replace crystal, and adjust frequency, table 4.5 or 4.13.

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STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
5	Same as Step 4a or b	A1C29 A1C27	Set A1C27 at maximum capacitance. Adjust A1C29 for maximum rf voltmeter indication. Set A1C27 at first maximum indication from maximum capacitance. Do not readjust A1C29.
6	Same as Step 4a or b	A1C17 A1C14	Set A1C14 at maximum capacitance. Adjust A1C17 for maximum rf voltmeter indication. Set A1C14 at first maximum indication from maximum capacitance. Do not readjust A1C17.
7	Same as Step 4a or b	A1C7 A1C3	Adjust A1C3 for minimum rf voltmeter indication. Adjust A1C7 for maximum rf voltmeter indication. Adjust A1C3 for maximum rf voltmeter indication. Do not readjust A1C7. Disconnect all test equipment and reconnect coax wire to pins A7P2, A7P3 (if disconnected in step 4b).

TABLE 4.3 RECEIVER ASSEMBLY A1
ALIGNMENT PROCEDURE

TABLE 4. 3 RECEIVER ASSEMBLY A1 ALIGNMENT PROCEDURE

REQUIRED TEST EQUIPMENT

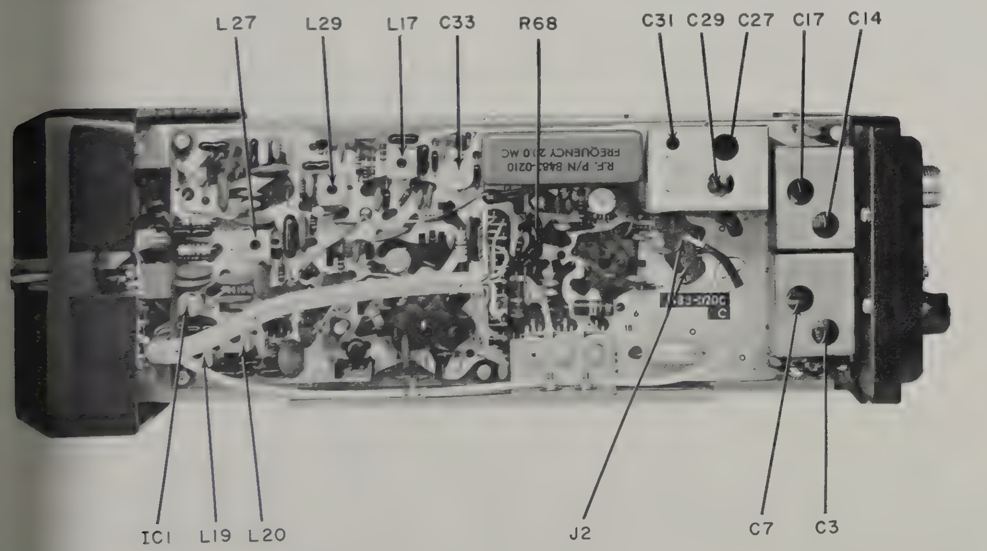
1. RF Signal Generator, Hewlett-Packard HP-606, or equivalent
2. FM Signal Generator, Marconi TF-1066 B/I, or equivalent
3. RF Voltmeter, Boonton 91CA, or equivalent
4. Electronic Frequency Counter, Hewlett-Packard HP-5242, or equivalent

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set CONTROL switch at LOCAL. (RF-401-2 and RF-404-3 only.)
4. Set SPEAKER switch at ON. (RF-401-2 and RF-404-3 only.)
5. For a badly misaligned receiver assembly, set all receiver assembly inductor slugs flush with bottom of board.
6. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

7. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
   NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 vdc indication.



STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	WARNING High voltages, that could be lethal, are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when the chassis is out of the case with power applied.		
1	RF Signal Generator A1J2 RF Voltmeter A1IC1 pin 1	A1C31 A1C33 A1L17 A1L29 A1L27	Disconnect coax wire connected to A1J2. Set rf signal generator frequency at 20.000 MHz (CW). Check frequency on electronic counter and maintain at 20.000 MHz. Adjust rf signal generator output level to obtain rf voltmeter indication 10 dB above noise level. Adjust capacitors and inductors for maximum rf voltmeter indication. Reduce rf signal generator output level to keep rf voltmeter indication below 300 mV. Repeat adjustment until no further increase is obtained on rf voltmeter.
2	RF Signal Generator A1J2 RF Voltmeter A1IC1 pin 5 VOM J5-17 (+), J5-13 (-)	A1L20 A1L19	Set rf signal generator output level at 100 uV. Adjust A1L20 for 0 (zero) indication on VOM and A1L19 for peak indication on rf voltmeter. Repeat adjustment until no further change is obtained on rf voltmeter and VOM. Disconnect rf signal generator, rf voltmeter and VOM. Reconnect coax wire to A1J2.
3	RF Voltmeter A1J2		RF Voltmeter should indicate 500 mV, minimum, on all channels. If indication is less, perform Multiplier Assembly A7 Alignment Procedure before proceeding with this procedure.
4			Calculate the bandwidth in percent, as follows: $BW(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] x\ 100$ F1 = lowest carrier frequency F2 = highest carrier frequency If the calculated bandwidth in percent is less than 0.40%, proceed to step 4a. If the calculated bandwidth is greater than 0.40%, proceed to step 4b.
4a	RF Voltmeter A1IC1 pin 1 FM Signal Generator J1		Set Channel Selector switch at low frequency channel. Set A1C3, A1C7, A1C14, A1C17, A1C27, A1C29, at mid-range. Set fm signal generator controls to produce a CW output at a level of 100 mV at the channel frequency. Carefully adjust fm signal generator frequency to ensure that signal is centered in crystal filter passband. Decrease fm signal generator output level, as required, to keep VTVM indication below 300 mV in the following steps.
4b	RF Signal Generator A7P2, A7P3 RF Voltmeter A1IC1 pin 1 FM Signal Generator J1		Disconnect coax wire from pins A7P2, A7P3. Set A1C3, A1C7, A1C14, A1C17, A1C27, A1C29 at mid-range. Set rf signal generator output level at 600 mV (measured across A7P2, A7P3) at frequency calculated as follows: $f_s = \left(\frac{F1 + F2}{2}\right) \div 8$ F1 = lowest carrier frequency F2 = highest carrier frequency Check rf signal generator frequency on electronic counter. Set fm signal generator at frequency calculated as follows: $f_s = \frac{F1 + F2}{2}$ Set fm signal generator output level at 100 mV. Carefully adjust fm signal generator frequency to ensure that signal is centered in crystal filter passband. Decrease fm signal generator output level, as required, to keep VTVM indication below 300 mV in the following steps.
5	Same as Step 4a or b	A1C29 A1C27	Set A1C27 at maximum capacitance. Adjust A1C29 for maximum rf voltmeter indication. Set A1C27 at first maximum indication from maximum capacitance. Do not readjust A1C29.
6	Same as Step 4a or b	A1C17 A1C14	Set A1C14 at maximum capacitance. Adjust A1C17 for maximum rf voltmeter indication. Set A1C14 at first maximum indication from maximum capacitance. Do not readjust A1C17.
7	Same as Step 4a or b	A1C7 A1C3	Adjust A1C3 for minimum rf voltmeter indication. Adjust A1C7 for maximum rf voltmeter indication. Adjust A1C3 for maximum rf voltmeter indication. Do not readjust A1C7. Disconnect all test equipment and reconnect coax wire to pins A7P2, A7P3 (if disconnected in step 4b).

TABLE 4. 3 RECEIVER ASSEMBLY A1
ALIGNMENT PROCEDURE

ABLE 4. 4 MULTIPLIER ASSEMBLY A7 AL

EQUIRED TEST EQUIPMENT

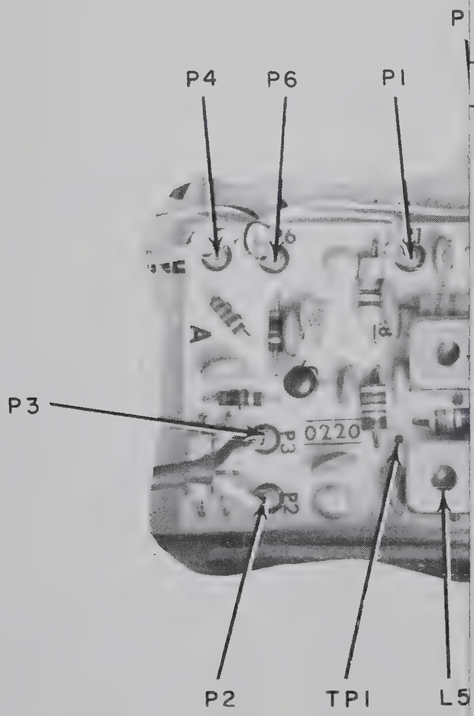
VOM, Simpson Model 260, or equivalent
RF Voltmeter, Boonton 91CA, or equivalent
RF Signal Generator, Hewlett-Packard HP-
Electronic Frequency Counter, Hewlett-Pac

RELIMINARY CHECKS AND ADJUSTMENTS

Rotate VOLUME control fully counterclockw
Rotate SQUELCH control fully clockwise.
Set CONTROL switch at LOCAL (RF-401-2
Ensure that primary voltage is at proper lev

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

Ensure that voltage, measured between pins
VOM, is at +10 vdc. If not, adjust A1R68 to
NOTE: On RF-403-2 used in land mobile in
vdc indication.



MULTIPLIER ASS

TUNING JUSTMENT	PROCEDURE
WARNING arious points on the chassis and pins 1 through 4 of test socket J5. Use extreme applied.	
	Calculate the bandwidth, in percent as follows: $$BW(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] \times 100$$ F1 = lowest carrier frequency F2 = highest carrier frequency If the calculated bandwidth, in percent, is less than 0.40%, proceed to step 1a. If calculated bandwidth is greater than 0.40%, proceed to step 1b.
A7L5 A7L4 A7L6	Set Channel Selector switch at low frequency channel. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Repeat until no further increase is observed on rf voltmeter. Disconnect rf voltmeter.
A7L5 A7L4 A7L6	Disconnect coax wire from A7P2, A7P3. Set rf signal generator output level at 600 mV (measured across A7P2, A7P3) at frequency calculated as follows: $$f_s = \left(\frac{F1 + F2}{2} - 20\right) \div 8$$ F1 = lowest carrier frequency F2 = highest carrier frequency Check rf signal generator frequency on electronic counter. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Disconnect rf voltmeter.
Note scale) connect positive lead to 50 uA jack and set range selector switch at	
A7L5 A7L4 A7L6	Adjust A7L5, A7L4, A7L6 for maximum VOM indication. Disconnect VOM.
A7L10	Adjust A7L10 for maximum rf voltmeter indication.
A7L11	Adjust A7L11 for maximum rf voltmeter indication. Repeat steps 2 through 4 until no further increase is observed on rf voltmeter. Disconnect test equipment and reconnect coax wire to A7P2, A7P3, if disconnected in step 1b.

TABLE 4. 4 MULTIPLIER ASSEMBLY A7
ALIGNMENT PROCEDURE

ABLE 4.4 MULTIPLIER ASSEMBLY A7 ALIGNMENT PROCEDURE

EQUIRED TEST EQUIPMENT

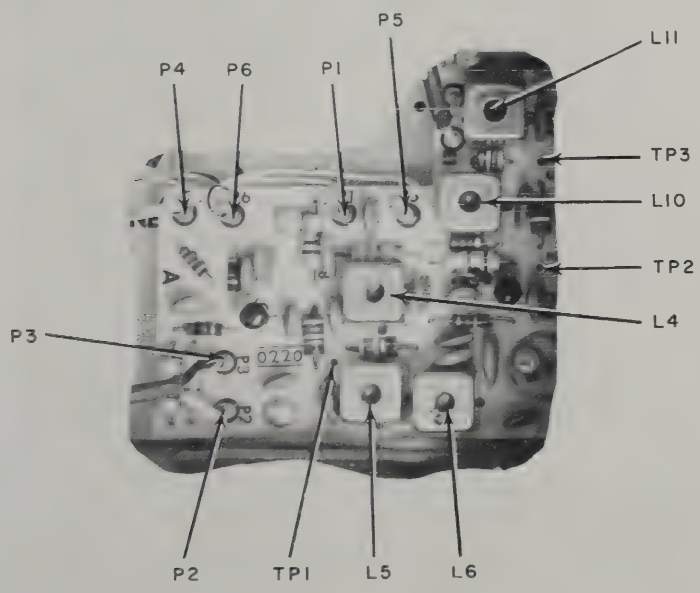
. VOM, Simpson Model 260, or equivalent
. RF Voltmeter, Boonton 91CA, or equivalent
. RF Signal Generator, Hewlett-Packard HP-606A, or equivalent
. Electronic Frequency Counter, Hewlett-Packard HP-5242, or equivalent

RELIMINARY CHECKS AND ADJUSTMENTS

. Rotate VOLUME control fully counterclockwise.
. Rotate SQUELCH control fully clockwise.
. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25 vdc indication.



MULTIPLIER ASSEMBLY A7

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	WARNING High voltages, that could be lethal are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when chassis is out of the case with power applied.		
1			Calculate the bandwidth, in percent as follows: $BW(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] \times 100$ F1 = lowest carrier frequency F2 = highest carrier frequency If the calculated bandwidth, in percent, is less than 0.40%, proceed to step 1a. If calculated bandwidth is greater than 0.40%, proceed to step 1b.
1a	RF Voltmeter A7Q2 Base	A7L5 A7L4 A7L6	Set Channel Selector switch at low frequency channel. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Repeat until no further increase is observed on rf voltmeter. Disconnect rf voltmeter.
1b	RF Voltmeter A7Q2 Base RF Signal Generator A7P2, A7P3	A7L5 A7L4 A7L6	Disconnect coax wire from A7P2, A7P3. Set rf signal generator output level at 600 mV (measured across A7P2, A7P3) at frequency calculated as follows: $f_s = \left(\frac{F1 + F2}{2} - 20\right) \div 8$ F1 = lowest carrier frequency F2 = highest carrier frequency Check rf signal generator frequency on electronic counter. Adjust A7L5, A7L4, A7L6 for maximum rf voltmeter indication. Disconnect rf voltmeter.
	Note To set up Simpson 260 VOM for 250 mV range (full scale) connect positive lead to 50 uA jack and set range selector switch at 50-volt range.		
2	VOM (250 mV) J5-20(+), J5-13 (-)	A7L5 A7L4 A7L6	Adjust A7L5, A7L4, A7L6 for maximum VOM indication. Disconnect VOM.
3	RF Voltmeter A1J2	A7L10	Adjust A7L10 for maximum rf voltmeter indication.
4	Same as Step 3	A7L11	Adjust A7L11 for maximum rf voltmeter indication. Repeat steps 2 through 4 until no further increase is observed on rf voltmeter. Disconnect test equipment and reconnect coax wire to A7P2, A7P3, if disconnected in step 1b.

TABLE 4.4 MULTIPLIER ASSEMBLY A7 ALIGNMENT PROCEDURE

'ABLE 4. 5 RECEIVER FREQUENCY CHECI

ɛEQUIRED TEST EQUIPMENT

. Electronic Frequency Counter, Hewlett-Pac

PRELIMINARY CHECKS AND ADJUSTMENTS

. Rotate VOLUME control fully counterclockw
. Set CONTROL switch at LOCAL (RF-401-2
. Ensure that primary voltage is at proper le

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

. Ensure that voltage, measured between pins
VOM, is at +10 vdc. If not, adjust A1R68 t
NOTE: On RF-403-2 used in land mobile in
vdc indication.

TUNING DJUSTMENT	PROCEDURE
	Set Channel Selector switch at channel to be checked. The crystal frequency indication observed on the frequency counter should be within ±10 cycles of crystal frequency for channel being checked. If indication is incorrect, proceed with step 2 to adjust the crystal frequency.
	Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Adjust this trimmer to obtain an indication of the crystal frequency that is within ±10 cycles of crystal frequency. Repeat steps 1 and 2 for remaining channels.

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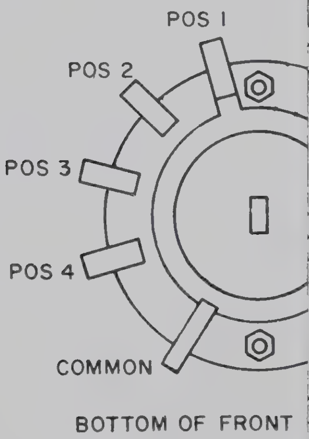
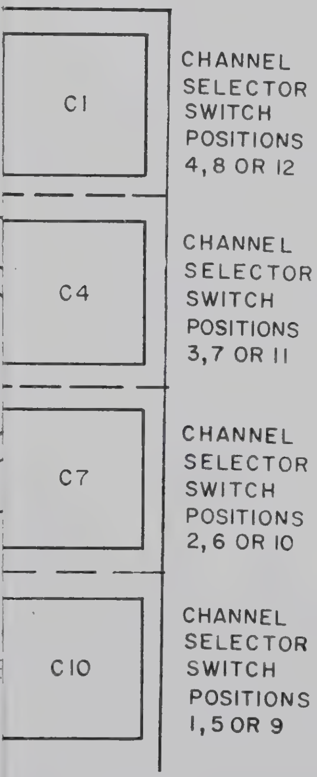


RF-403-2 (4-CHANNEL)
SELECTOR SWITCH S4, F


C1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
C4
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
C7
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
C10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

IBLY A3 (PARTIAL VIEW)
L/TRIMMER LOCATION

TABLE 4. 5 RECEIVER FREQUENCY CHECK/
ADJUSTMENT PROCEDURE

TABLE 4.5 RECEIVER FREQUENCY CHECK/ADJUSTMENT PROCEDURE

REQUIRED TEST EQUIPMENT

1. Electronic Frequency Counter, Hewlett-Packard HP-5242 or equivalent

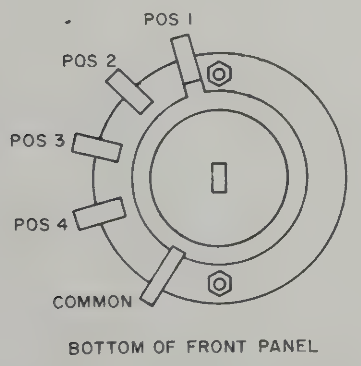
PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
3. Ensure that primary voltage is at proper level, as follows:

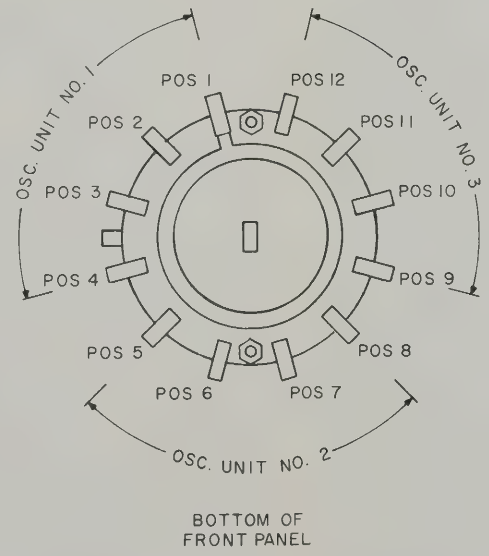
RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

4. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
   NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25 vdc indication.

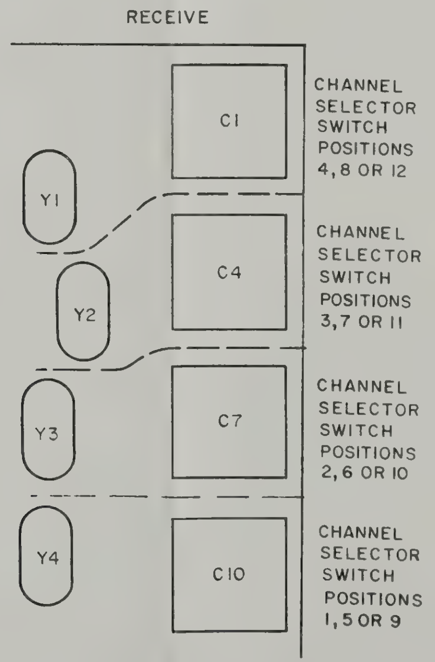
STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
1	Frequency counter A7P2 (+), A7P3 (-)		Set Channel Selector switch at channel to be checked. The crystal frequency indication observed on the frequency counter should be within ±10 cycles of crystal frequency for channel being checked. If indication is incorrect, proceed with step 2 to adjust the crystal frequency.
2	Same as step 1		Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Adjust this trimmer to obtain an indication of the crystal frequency that is within ±10 cycles of crystal frequency. Repeat steps 1 and 2 for remaining channels.



RF-403-2 (4-CHANNEL) CHANNEL SELECTOR SWITCH S4, REAR VIEW



RF-401-2, RF-404-3 CHANNEL SELECTOR SWITCH S4, WAFER A, REAR VIEW


RECEIVE
C1
Y1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
C4
Y2
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
C7
Y3
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
C10
Y4
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

OSCILLATOR ASSEMBLY A3 (PARTIAL VIEW) RECEIVE CRYSTAL/TRIMMER LOCATION

TABLE 4.6 QUIETING SENSITIVITY MEASUREMENT

REQUIRED TEST EQUIPMENT

1. FM Signal Generator, Marconi TF-1066 B/I, or equivalent
2. AC VTVM, Ballantine 314A, or equivalent

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
4. Set SPEAKER switch at ON (RF-401-2 and RF-404-3 only).
5. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

6. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication. NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25 vdc indication.

STEP	TEST EQUIPMENT AND CONNECTION POINT	PROCEDURE
1	AC VTVM J5-15 (+), J5-13 (-)	Set Channel Selector switch at channel to be checked. Adjust VOLUME control to obtain AC VTVM indication as shown below. RF-401-2 1.8 volts rms RF-403-2 1.8 volts rms RF-404-3 4.0 volts rms
2	FM Signal Generator J1 (Antenna)	Set fm signal generator frequency controls to produce an output at the channel frequency at 10 uV (CW). Decrease fm signal generator output level to obtain an AC VTVM indication that is 20 dB down from indication in step 1. Adjust fm signal generator frequency control to obtain maximum quieting. Re-adjust fm signal generator output level to obtain AC VTVM indication that is 20 dB down from indication in step 1. The fm signal generator indicated output level should be 0.5 uV or less.

TABLE 4.7 SQUELCH SENSITIVITY MEASUREMENT

REQUIRED TEST EQUIPMENT

1. FM Signal Generator, Marconi TF-1066 B/I or equivalent.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
4. Set SPEAKER switch at ON (RF-401-2 and RF-404-3 only).
5. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

6. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
   NOTE: On RF-403-2 used in land and mobile installations, set A1R68 to obtain a +9.25 vdc indication.

STEP	TEST EQUIPMENT AND CONNECTION POINT	PROCEDURE
1	FM signal generator J1 (Antenna)	Set Channel Selector switch at channel to be checked. Set fm signal generator controls to produce an output at the channel frequency at a 0.5 uV level, with a modulating frequency of 1.0 kHz. Set deviation at ±3.3 kHz. Adjust fm signal generator frequency control for maximum receiver audio output. Set fm signal generator output level control for no output. Rotate SQUELCH control counterclockwise until receiver is just squelched. Slowly increase fm signal generator output level until squelch threshold is just overridden. The fm signal generator output level should be 0.35 uV or less.

TABLE 4.8 AUDIO OUTPUT POWER AND DISTORTION MEASUREMENT

REQUIRED TEST EQUIPMENT

1. FM Signal Generator, Marconi TF-1066 B/I, or equivalent
2. Distortion Analyzer, Hewlett-Packard HP-331A, or equivalent

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Rotate SQUELCH control fully clockwise.
3. Set SPEAKER switch at ON (RF-401-2 and RF-404-3 only).
4. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
5. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13.6 vdc
RF-403-2	13.6 vdc
RF-404-3	27.5 vdc

6. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
   NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9.25 vdc indication.

STEP	TEST EQUIPMENT AND CONNECTION POINT	PROCEDURE
1	FM Signal Generator J1 (Antenna)	Set Channel Selector switch at channel to be checked. Set fm signal generator controls to produce an output at the channel frequency at a 100 uV level with a modulating frequency of 1 kHz. Set deviation at ±3.3 kHz.
2	Distortion Analyzer J5-15 (+), J5-13 (-)	Set distortion analyzer controls to measure audio output voltage. Adjust VOLUME control to obtain indication as shown below: RF-401-2 3.5 volts rms RF-403-2 3.5 volts rms RF-404-3 8.0 volts rms Set distortion analyzer controls to measure distortion. The distortion indicated should not exceed 10%.

BLE 4. 9 RECEIVER NETTING PROCEDU

NOT

The following procedure allows
out having to use a frequency co
intended to replace the receiver
(table 4. 5) and is provided for E

QUIRED TEST EQUIPMENT

VOM, Simpson 260, or equivalent

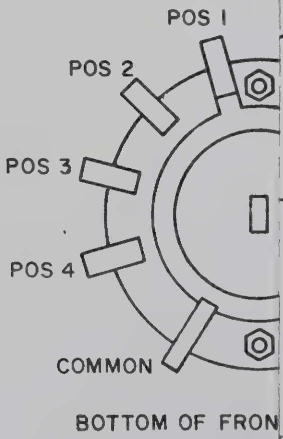
ELIMINARY CHECKS AND ADJUSTMENTS

Rotate VOLUME control fully counterclock
Rotate SQUELCH control fully clockwise.
Set SPEAKER switch at ON (RF-401-2 and
Set CONTROL switch at LOCAL (RF-401-2
Ensure that primary voltage is at proper le

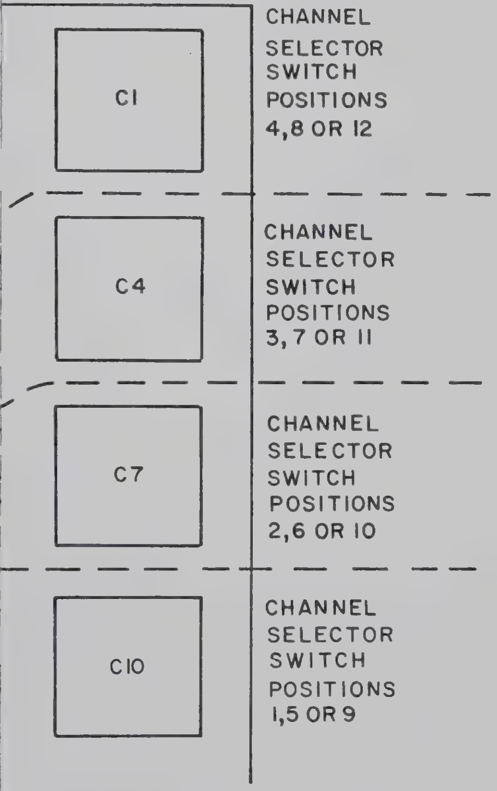
RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

Ensure that voltage, measured betwen pins
VOM, is at +10 vdc. If not adjust A1R68 to
NOTE: On RF-403-2 used in land mobile in
vdc indication.

TUNING DJUSTMENT	PROCEDURE
ll scale), connect positive lead to 50-microamp jack and set range selector	
	Set Channel Selector switch at channel to be netted. Looking at the rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer by referring to figures below. With a signal (from the transmitter to which the receiver is being netted) applied to the receiver, adjust trimmer to obtain a 0 vdc indication on the VOM.
	Repeat step 1 for remaining channels. Disconnect VOM.



RF-403-2 (4-CHANNE
SELECTOR SWITCH S4


C1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
C4
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
C7
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
C10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

R ASSEMBLY A3 (PARTIAL VIEW)
RYSTAL/TRIMMER LOCATION

TABLE 4. 9 RECEIVER
NETTING PROCEDURE

ABLE 4.9 RECEIVER NETTING PROCEDURE

NOTE

The following procedure allows adjustment of the receiver without having to use a frequency counter. This procedure is not intended to replace the receiver frequency adjustment procedure (table 4. 5) and is provided for EMERGENCY use only.

EQUIRED TEST EQUIPMENT

. VOM, Simpson 260, or equivalent

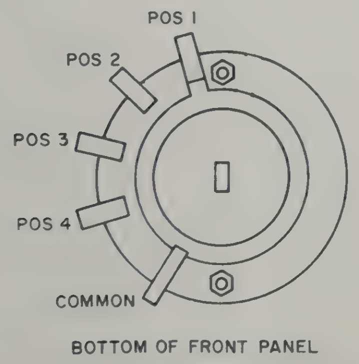
RELIMINARY CHECKS AND ADJUSTMENTS

. Rotate VOLUME control fully counterclockwise.
. Rotate SQUELCH control fully clockwise.
. Set SPEAKER switch at ON (RF-401-2 and RF-404-3 only).
. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
. Ensure that primary voltage is at proper level as follows:

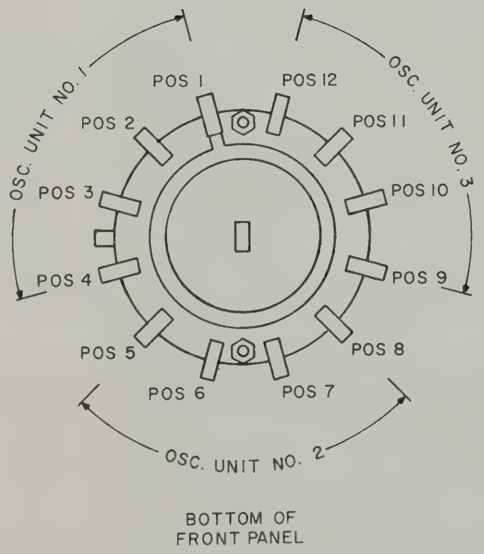
RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not adjust A1R68 to obtain +10 vdc indication. NOTE: On RF-403-2 used in land mobile installation, set A1R68 to obtain a +9. 25 vdc indication.

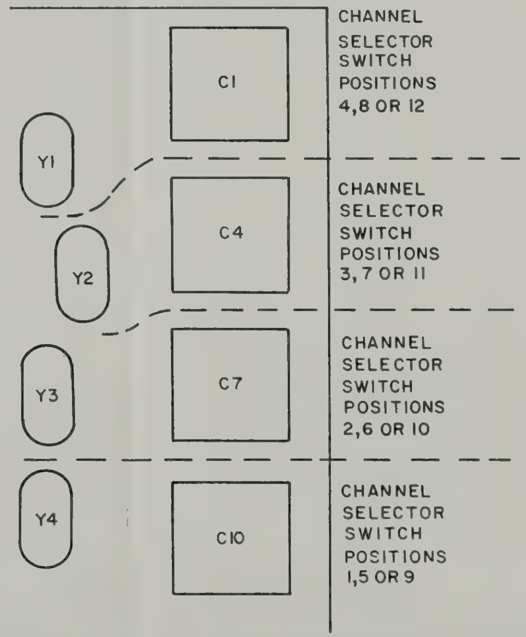
STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	To set up Simpson 260 VOM for 250 mV range (full scale), connect positive lead to 50-microamp jack and set range selector switch at 50-volt range.		
1	VOM (250 mV) J5-17 (+), J5-13 (-)		Set Channel Selector switch at channel to be netted. Looking at the rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer by referring to figures below. With a signal (from the transmitter to which the receiver is being netted) applied to the receiver, adjust trimmer to obtain a 0 vdc indication on the VOM.
2	Same as step 1		Repeat step 1 for remaining channels. Disconnect VOM.



RF-403-2 (4-CHANNEL) CHANNEL SELECTOR SWITCH S4, REAR VIEW



RF-401-2, RF-404-3 CHANNEL SELECTOR SWITCH S4, WAFER A, REAR VIEW


C1
CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
Y1
C4
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
Y2
Y3
C7
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
Y4
C10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9

OSCILLATOR ASSEMBLY A3 (PARTIAL VIEW) RECEIVE CRYSTAL/TRIMMER LOCATION

TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
VOM (250 mV) J5-5 (+), J5-10 (-)	A2C60	Key transmitter and adjust A2C60 to obtain 175 mV indication on VOM. Unkey. Disconnect rf signal generator from A2J1 and reconnect coax wire to A2J1.

TABLE 4.10 EXCITER ASSEMBLY A2 ALIGNMENT PROCEDURE

TABLE 4.10 EXCITER ASSEMBLY A2 ALIGNMENT PROCEDURE

REQUIRED TEST EQUIPMENT

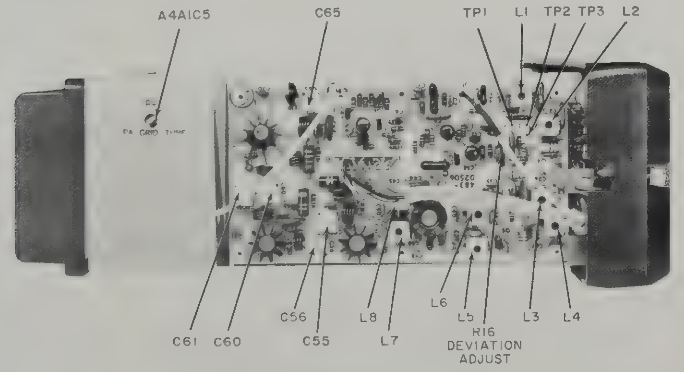
1. VOM, Simpson Model 260 or equivalent
2. Dummy Load, 50-ohm, 100 watt

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
3. Set TUNE/OPERATE switch at TUNE.
4. Set all Exciter Assembly capacitors at minimum capacitance.
5. Carefully rotate Exciter Assembly inductor slugs fully counterclockwise (minimum inductance).
6. Set all PA Assembly capacitors at minimum capacitance.
7. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

8. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
   NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 vdc indication.



EXCITER ASSEMBLY A2

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	WARNING High voltages, that could be lethal, are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when chassis is out of the case with power applied.		
	CAUTION Do not keep transmitter keyed any longer than is required to make adjustment.		
	CAUTION When moving VOM leads on test socket J5, remove both leads to prevent possible damage to equipment.		
1			Calculate bandwidth, in percent, as follows: $BW(\%) = \left[\frac{F2 - F1}{\left(\frac{F1 + F2}{2}\right)}\right] \times 100$ F1 = lowest carrier frequency F2 = highest carrier frequency If calculated bandwidth, in percent, is less than 0.40%, proceed to step 1a. If calculated bandwidth is greater than 0.40%, proceed to step 1b.
1a	VOM (2.5 volt) J5-6 (+), J5-13 (-)	A2L1 A2L2	Set Channel Selector switch at low frequency channel. Key transmitter and alternately adjust A2L1, A2L2, for maximum VOM indication. Unkey. (When first adjusting A2L1, A2L2, VOM indication may be erratic.) Key transmitter and rotate A2L1 tuning slug counterclockwise to obtain VOM indication of 1/4 of maximum indication. Slowly adjust A2L2 to obtain maximum VOM indication. Slowly rotate A2L1 tuning slug clockwise to obtain maximum VOM indication. Unkey.
1b	VOM (2.5 volt) J5-6 (+), J5-13 (-) RF Signal Generator A2J1	A2L1 A2L2	Disconnect coax wire from A2J1. Set rf signal generator output level at 900 mV rms (measured at A2J1) at frequency calculated as follows: $f_s = \frac{F1 + F2}{2} \div 12$ F1 = lowest carrier frequency F2 = highest carrier frequency Check frequency on electronic counter. Key transmitter and alternately adjust A2L1 and A2L2 for maximum VOM indication. Unkey. (When first adjusting A2L1 and A2L2, VOM indication may be erratic.) Key transmitter and rotate A2L1 tuning slug counterclockwise to obtain VOM indication of 1/4 of maximum indication. Slowly adjust A2L2 to obtain maximum VOM indication. Slowly rotate A2L1 tuning slug clockwise to obtain maximum VOM indication. Unkey.
2	VOM (2.5 volt) J5-7 (+), J5-13 (-)	A2L4 A2L3	Key transmitter and alternately adjust A2L4 and A2L3 for maximum VOM indication. Unkey. Adjust A2L3, with transmitter keyed, to obtain VOM indication that is 1/4 of maximum VOM indication. Carefully adjust A2L4 to obtain maximum VOM indication, then carefully adjust A2L3 to obtain maximum VOM indication. Unkey.
3	VOM (2.5 volt) J5-8 (+), J5-13 (-)	A2L6 A2L5	Key transmitter and alternately adjust A2L6 and A2L5 for maximum VOM indication. Unkey. Adjust A2L5, with transmitter keyed, to obtain VOM indication that is 1/4 of maximum VOM indication. Carefully adjust A2L6 to obtain maximum VOM indication, then adjust A2L5 to obtain maximum VOM indication. Unkey.
	Note To set up Simpson 260 VOM for 250 mV range (full scale), connect positive lead to 50 uA jack and set range selector switch at 50-volt range.		
4	VOM (250 mV) J5-5 (+), J5-9 (-)	A2L8 A2L7	Set A2C65 at maximum capacitance. Key transmitter and alternately adjust A2L8 and A2L7 for maximum VOM indication. Unkey. Adjust A2L7, with transmitter keyed, to obtain VOM indication that is 1/4 of maximum VOM indication. Carefully adjust A2L8 to obtain maximum VOM indication, then adjust A2L7 to obtain maximum VOM indication. Unkey
5	Same as Step 4	A2C56	Set A2C55 at maximum capacitance. Key transmitter and adjust A2C56 for a dip. Unkey. (If two dips are present, use dip closest to maximum capacitance.)
6	VOM (250 mV) J5-5 (+), J5-10 (-)	A2C61	Set A2C60 at mid-range. Key transmitter and adjust A2C61 for a dip. Unkey. (If two dips are present, use dip closest to maximum capacitance.)
7	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Set A2C65 to minimum capacity. Key transmitter. If indication is greater than 140, or if an indication of 140 can be obtained by increasing A2C65 capacity before a maximum indication is reached, unkey transmitter and set A2C65 to maximum capacity and proceed to step 9. If an indication of 140 is not obtained, tune for the first peak indication from minimum capacity and proceed to step 8.
8	Same as Step 7	A2C65 A2C55	Key transmitter and adjust A2C55 (decrease capacitance) to obtain VOM indication of 140 mV. Unkey. Set A2C65 at maximum capacitance.
9	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A1C5 A2C65	Key transmitter and adjust A4A1C5 for maximum VOM indication. Unkey. If indication can not be obtained, slightly decrease capacitance of A2C65. Key transmitter and readjust A4A1C5 for maximum VOM indication. Unkey. Repeat, as required to obtain a VOM indication
10	VOM (250 mV) J5-5 (+), J5-9 (-)	A2C56	Set A2C55 at mid-range. Key transmitter and adjust A2C56 for minimum VOM indication. Unkey
11	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A1C5 A2C65	Key transmitter and alternately adjust A4A1C5, A2C65 for maximum VOM indication. Unkey.
12	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and note VOM indication. Unkey. If indication is 225 mV or less, proceed to step 13. If VOM indication is greater than 225 mV, key transmitter and adjust A2C65 (increase capacitance) to obtain 225 mV indication. Unkey.
13	VOM (10 volt) J5-3 (+), J5-4 (-)	A2C61 A2C60	Key transmitter and alternately adjust A2C61, A2C60 for maximum VOM indication. Unkey.
14	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and note VOM indication. Unkey. If indication is less than 225 mV, proceed to step 15. If indication is greater than 225 mV, key transmitter and adjust A2C65 (increase capacitance) to obtain 225 mV indication. Unkey.
15	VOM (10 volt) J5-3 (+), J5-4 (-)	A2C56 A2C55	Key transmitter and alternately adjust A2C56, A2C55 for maximum VOM indication. Unkey.
16	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and note VOM indication. Unkey. If indication is less than 225 mV, proceed to step 17. If indication is greater than 225 mV, key transmitter and adjust A2C65 (increase capacitance) to obtain 225 mV indication. Unkey.
17			Repeat steps 13 through 16 until no further increase is observed on VOM.
18	VOM (250 mV) J5-5 (+), J5-10 (-)	A2C60	Key transmitter and adjust A2C60 to obtain 175 mV indication on VOM Unkey.
19	VOM (250 mV) J5-5 (+), J5-9 (-)	A2C55	Key transmitter and adjust A2C55 to obtain 125 mV indication on VOM. Unkey.
	VOM (250 mV) J5-5 (+), J5-10 (-)	A2C60	Key transmitter and adjust A2C60 to obtain 175 mV indication on VOM. Unkey. Disconnect rf signal generator from A2J1 and reconnect coax wire to A2J1

TABLE 4.10 EXCITER ASSEMBLY A2
ALIGNMENT PROCEDURE

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STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
10			Repeat step 6, then step 9.
11			The rf wattmeter should indicate 25 watts (typical) for the 25 watt transceiver and 80 watts (typical) for the 80 watt transceiver. Carefully tighten locking nut on A4A2C1, making sure that setting is not disturbed.

TABLE 4.11 PA ASSEMBLY A4 TUNING PROCEDURE

TABLE 4.11 PA ASSEMBLY A4 TUNING PROCEDURE

NOTE

If PA was initially tuned into a dummy load, this procedure will have to be repeated when transceiver is connected to the antenna.

REQUIRED TEST EQUIPMENT

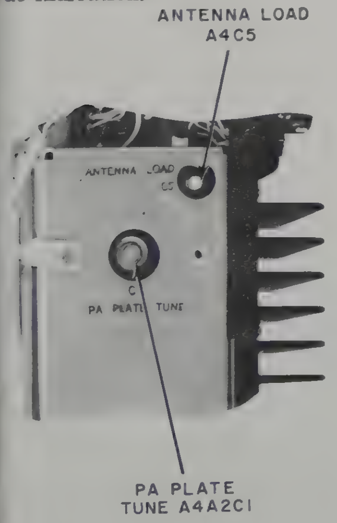
1. VOM, Simpson Model 260, or equivalent
2. RF Wattmeter, Micro-Match 711N, or equivalent
3. Dummy Load, 50-ohm, 100-watt

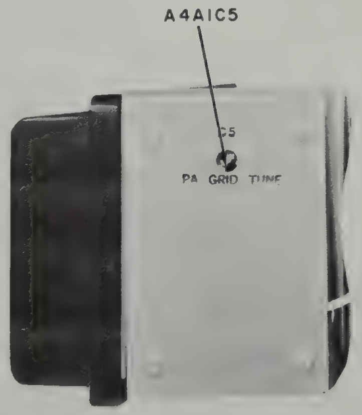
PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockwise.
2. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
3. Set TUNE/OPERATE switch at TUNE.
4. Loosen locking nut on A4A2C1 and set both A4A2C1 and A4C5 at minimum capacitance.
5. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

6. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication. NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 vdc indication.





STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
	Note Do not deviate from procedure. Perform procedure exactly as given.		
	WARNING High voltages, that could be lethal, are present at various points on the chassis and pins 1 through 4 of test socket J5. Use extreme caution when chassis is out of the case with power applied.		
	CAUTION Do not keep transmitter keyed any longer than is required to make adjustment. When moving VOM leads on test socket J5, remove both leads to prevent possible damage to equipment.		
1	VOM (250 mV) J5-3 (+), J5-4 (-)	A2C65 A4A1C5	Set A2C65 at maximum capacitance. Set Channel Selector switch at high frequency channel. Key transmitter and adjust A4A1C5 to obtain maximum VOM indication. Unkey. Key transmitter and adjust A2C65 to obtain maximum VOM indication. Unkey. Repeat adjustments until no further increase is obtained on VOM.
2	Same as Step 1	A4A1C5	Set Channel Selector switch at low frequency channel. Key transmitter and adjust A4A1C5 to obtain maximum VOM indication. Unkey.
	WARNING PA plate voltage is present at pin 2 of test socket J5 when transmitter is keyed. Therefore, the VOM will be 650 volts dc above ground when connected between pins 1 and 2 of test socket J5 with transmitter keyed.		
3	VOM (2.5 volt) J5-1 (+), J5-2 (-)	A4A2C1	Key transmitter and adjust A4A2C1 for a dip. Unkey. Set TUNE/OPERATE switch at OPERATE. Key transmitter and readjust A4A2C1 for a dip. Unkey.
4	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A1C5	Key transmitter and adjust A4A1C5 for peak indication. Unkey.
5	VOM (2.5 volt) J5-1 (+), J5-2 (-)	A4C5 A4A2C1	Key transmitter and adjust A4C5 for an increase of 0.25 volt on VOM. Unkey. Key transmitter and adjust A4A2C1 for a dip. Unkey. Repeat adjusting A4C5 and A4A2C1 until a VOM indication of 1.65 volts is obtained for a 25 watt transceiver or 2.0 volts for an 80 watt transceiver. Make sure that A4A2C1 is adjusted for a dip as the last step.
6	VOM (10 volt) J5-3 (+), J5-4 (-)	A4A2C5	Key transmitter and set Channel Selector switch alternately at low and high frequency channels, noting VOM indication. Unkey. Adjust A4A2C5, with transmitter keyed, to obtain the same VOM indication at the low and high frequency channels. Unkey.
7	VOM (2.5 volt) J5-1 (+), J5-2 (-)	A4A2C1	Key transmitter and set Channel Selector switch alternately at low and high frequency channels, noting VOM indication. Unkey. Adjust A4A2C1, with transmitter keyed, to obtain the same VOM indication at the low and high frequency channels. **Note** This should be accomplished by setting the Channel Selector switch at the channel producing the highest indication and slowly adjust A4A2C1 to decrease the indication.
8			Repeat steps 6 and 7 until the plate and grid currents are equalized at the high and low frequency channels.
9	VOM (250 mV) J5-5 (+), J5-11 (-)	A2C65	Key transmitter and set Channel Selector switch at each active channel, noting indication produced at each channel. Unkey transmitter and set Channel Selector switch at channel that produced highest indication. Key transmitter and adjust A2C65 (increase capacitance to decrease indication) to obtain VOM indication of 200 mV. Unkey.
10			Repeat step 6, then step 9.
11			The rf wattmeter should indicate 25 watts (typical) for the 25 watt transceiver and 80 watts (typical) for the 80 watt transceiver. Carefully tighten locking nut on A4A2C1, making sure that setting is not disturbed.

TABLE 4.11 PA ASSEMBLY A4 TUNING PROCEDURE

TABLE 4. 12 DEVIATION CHECK/ADJUSTM

REQUIRED TEST EQUIPMENT

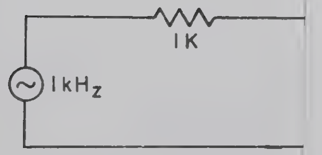
1. Dummy Load, 50 ohm, 100 watt
2. Audio Signal Generator, Hewlett-Packard H
3. Carrier Deviation Meter, Marconi TF-791D
4. 390-ohm, 10%, 1/2 W Resistor
5. 1K, 10%, 1/2 W Resistor

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Rotate VOLUME control fully counterclockw
2. Set CONTROL switch at LOCAL (RF-401-2
3. Ensure that primary voltage is at proper le

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

4. Ensure that voltage, measured between pins VOM, is at +10 vdc. If not, adjust A1R68 t NOTE: On RF-403-2 used in land mobile in vdc indication.



PAD FABRICA
CONNECTION

TUNING JUSTMENT	PROCEDURE
	Set audio signal generator controls to produce an output of 1 kHz at 2 volts rms (measured across pins E and F of J12). Set up carrier deviation meter and key transmitter. Make sure that no audio is applied (through microphone) to the transmitter, when keyed. Adjust audio signal generator frequency control to obtain maximum indication on either positive or negative deviation, whichever is greater. Unkey. Indicated deviation should be 5 kHz. If indication is not correct proceed to step 2.
A2R16	Key transmitter. Make sure that no audio is applied (through microphone) when transmitter is keyed. Adjust A2R16 to obtain deviation indication of 5 kHz, on either positive or negative deviation. Unkey. Disconnect all test equipment.

TABLE 4. 12 DEVIATION CHECK/
ADJUSTMENT PROCEDURE

ABLE 4. 12 DEVIATION CHECK/ADJUSTMENT PROCEDURE

EQUIRED TEST EQUIPMENT

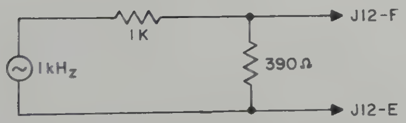
. Dummy Load, 50 ohm, 100 watt
. Audio Signal Generator, Hewlett-Packard HP-200AB or equivalent
. Carrier Deviation Meter, Marconi TF-791D or equivalent
. 390-ohm, 10%, 1/2 W Resistor
. 1K, 10%, 1/2 W Resistor

RELIMINARY CHECKS AND ADJUSTMENTS

. Rotate VOLUME control fully counterclockwise.
. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
. Ensure that primary voltage is at proper level, as follows:

RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
NOTE: On RF-403-2 used in land mobile installation, set A1R68 to obtain a +9. 25 vdc indication.



PAD FABRICATION AND CONNECTION DIAGRAM

STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
1	Audio signal generator (See figure below)		Set audio signal generator controls to produce an output of 1 kHz at 2 volts rms (measured across pins E and F of J12). Set up carrier deviation meter and key transmitter. Make sure that no audio is applied (through microphone) to the transmitter, when keyed. Adjust audio signal generator frequency control to obtain maximum indication on either positive or negative deviation, whichever is greater. Unkey. Indicated deviation should be 5 kHz. If indication is not correct proceed to step 2.
2	Same as step 1	A2R16	Key transmitter. Make sure that no audio is applied (through microphone) when transmitter is keyed. Adjust A2R16 to obtain deviation indication of 5 kHz, on either positive or negative deviation. Unkey. Disconnect all test equipment.

ABLE 4. 13 TRANSMITTER FREQUENCY C

EQUIRED TEST EQUIPMENT

Electronic Frequency Counter, Hewlett-Pac

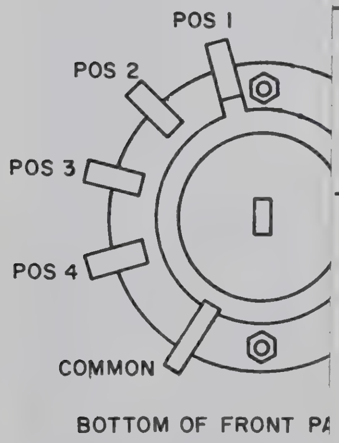
RELIMINARY CHECKS AND ADJUSTMENTS

Rotate VOLUME control fully counterclockw
Set CONTROL switch at LOCAL (RF-401-2 a
Ensure that primary voltage is at proper lev

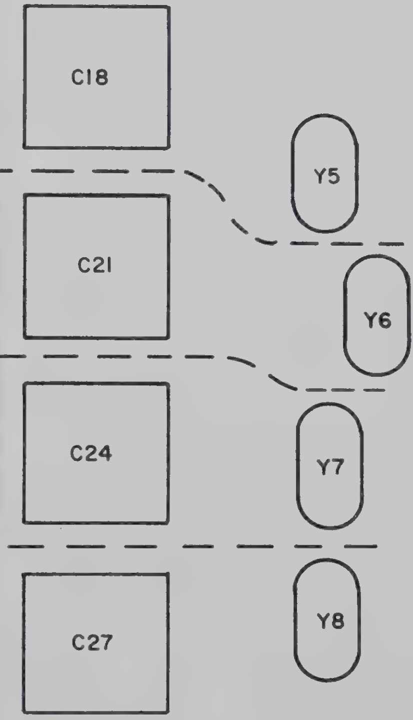
RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

Ensure that voltage, measured between pins
VOM, is at +10 vdc. If not, adjust A1R68 to
NOTE: On RF-403-2 used in land mobile ins
vdc indication.

TUNING JUSTMENT	PROCEDURE
	Set Channel Selector switch at channel to be checked. Key transmitter and note frequency indication on counter. Unkey. The frequency indication should be within ±100 cycles of channel frequency for channel being checked. Repeat for remaining channels. If indication is incorrect, proceed with step 2.
	Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Key transmitter and adjust this trimmer to obtain an indication that is within ±100 cycles of the channel frequency. Unkey. Repeat for remaining channels.



RF-403-2 (4-CHANNEL) C
SELECTOR SWITCH S4, RE



SSEMBLY A3 (PARTIAL VIEW)
STAL/TRIMMER LOCATION

TABLE 4. 13 TRANSMITTER FREQUENCY
CHECK/ADJUSTMENT PROCEDURE

ABLE 4. 13 TRANSMITTER FREQUENCY CHECK/ADJUSTMENT PROCEDURE

EQUIRED TEST EQUIPMENT

. Electronic Frequency Counter, Hewlett-Packard HP-5242, or equivalent

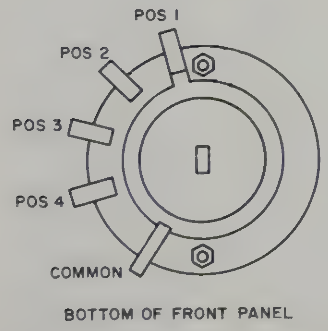
RELIMINARY CHECKS AND ADJUSTMENTS

. Rotate VOLUME control fully counterclockwise.
. Set CONTROL switch at LOCAL (RF-401-2 and RF-404-3 only).
. Ensure that primary voltage is at proper level, as follows:

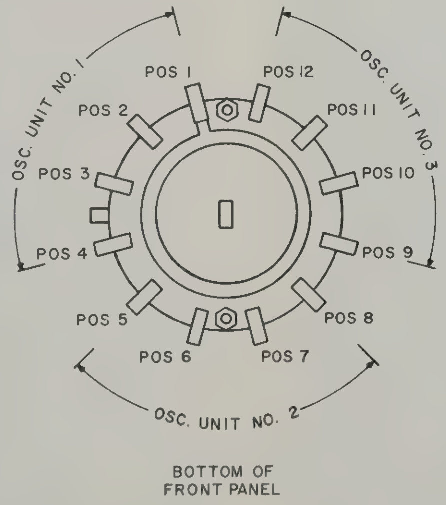
RF-401-2	13. 6 vdc
RF-403-2	13. 6 vdc
RF-404-3	27. 5 vdc

. Ensure that voltage, measured between pins 14 (+) and 13 (-) of test socket J5 with VOM, is at +10 vdc. If not, adjust A1R68 to obtain +10 vdc indication.
NOTE: On RF-403-2 used in land mobile installations, set A1R68 to obtain a +9. 25 vdc indication.

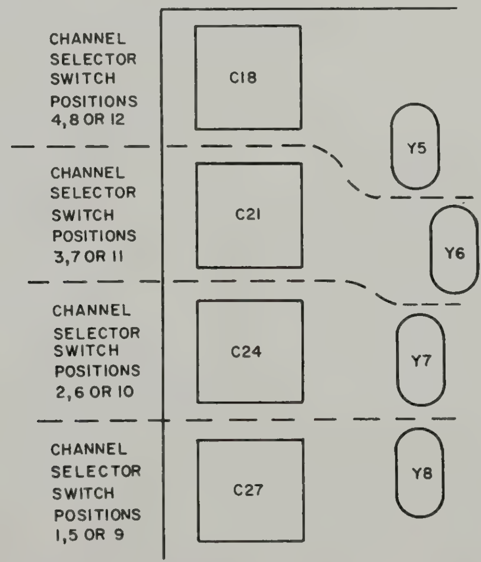
STEP	TEST EQUIPMENT AND CONNECTION POINT	TUNING ADJUSTMENT	PROCEDURE
1	Frequency Counter J1 (through attenuator)		Set Channel Selector switch at channel to be checked. Key transmitter and note frequency indication on counter. Unkey. The frequency indication should be within ±100 cycles of channel frequency for channel being checked. Repeat for remaining channels. If indication is incorrect, proceed with step 2.
2	Same as step 1		Looking at rear of Channel Selector switch, locate switch terminal that is in contact with switch wiper. Identify switch position and crystal trimmer. Key transmitter and adjust this trimmer to obtain an indication that is within ±100 cycles of the channel frequency. Unkey. Repeat for remaining channels.



RF-403-2 (4-CHANNEL) CHANNEL SELECTOR SWITCH S4, REAR VIEW



RF-401-2, RF-404-3 CHANNEL SELECTOR SWITCH S4, WAFER A, REAR VIEW


CHANNEL SELECTOR SWITCH POSITIONS 4,8 OR 12
CHANNEL SELECTOR SWITCH POSITIONS 3,7 OR 11
CHANNEL SELECTOR SWITCH POSITIONS 2,6 OR 10
CHANNEL SELECTOR SWITCH POSITIONS 1,5 OR 9
C18
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C24
C27
Y5
Y6
Y7
Y8

OSCILLATOR ASSEMBLY A3 (PARTIAL VIEW) RECEIVE CRYSTAL/TRIMMER LOCATION

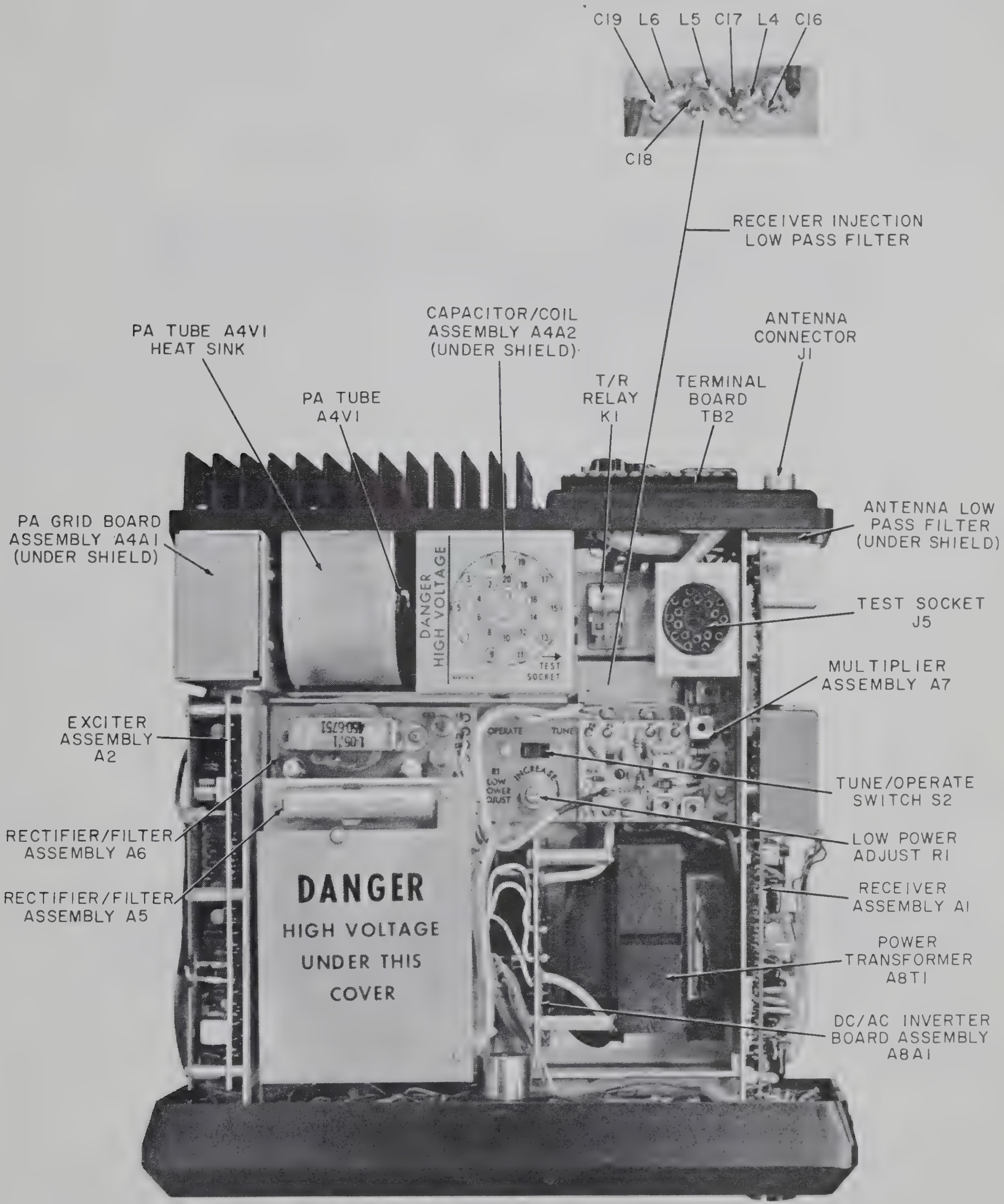


FIGURE 4. 1 - RF-401-2 AND RF-404-3
TOP VIEW

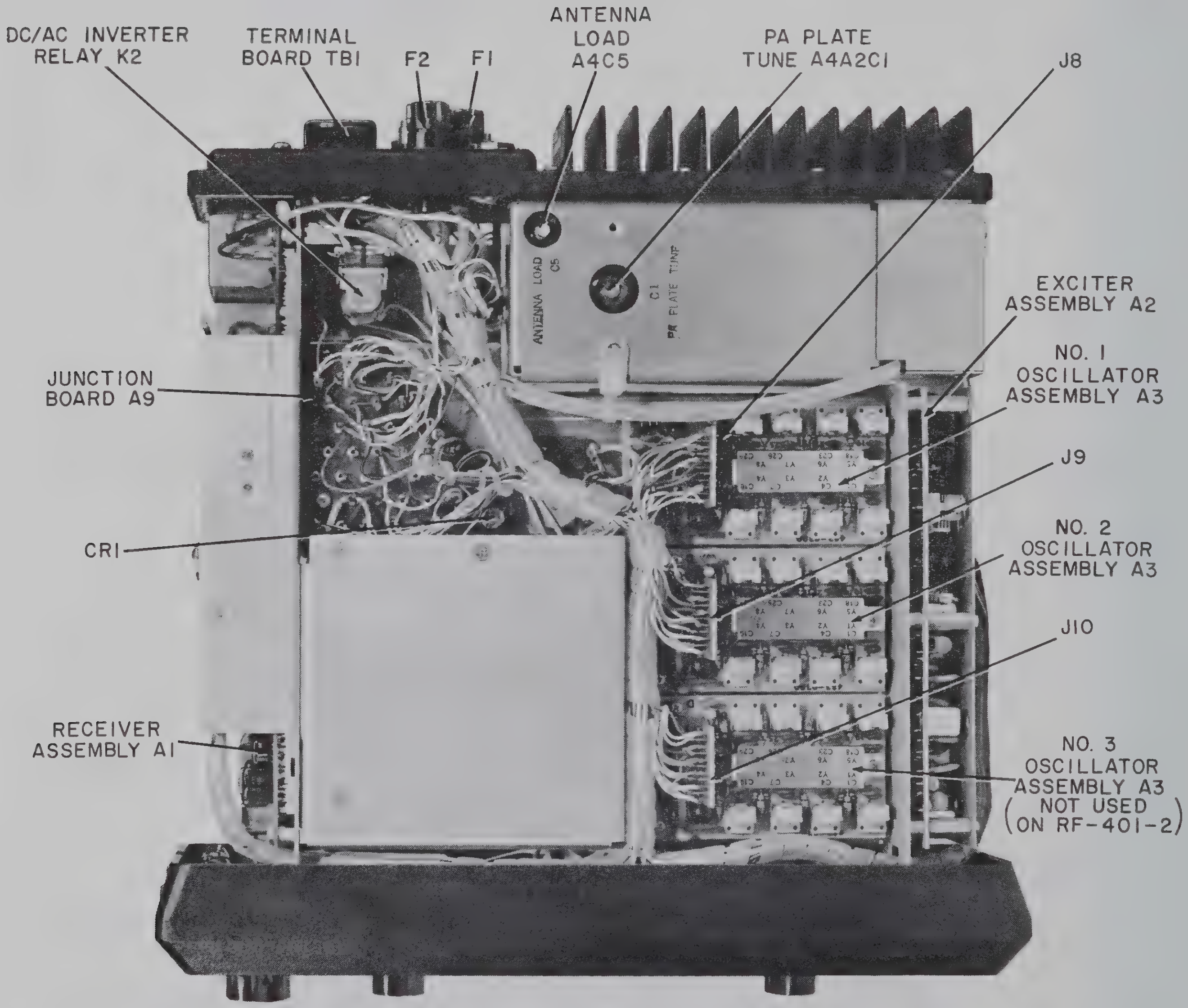


FIGURE 4.2 - RF-401-2 AND RF-404-3
BOTTOM VIEW

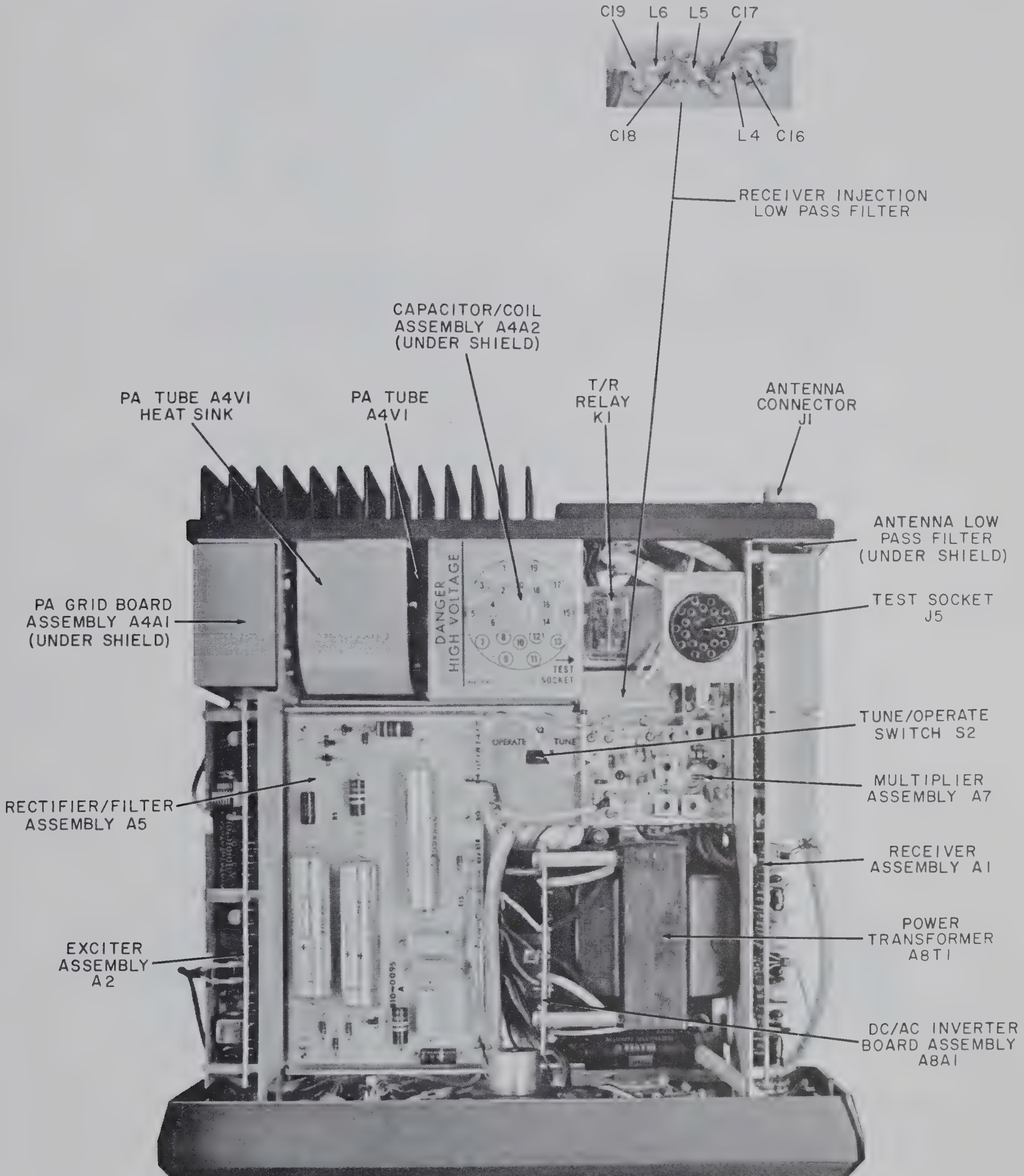


FIGURE 4. 3 - RF-403-2 TOP VIEW

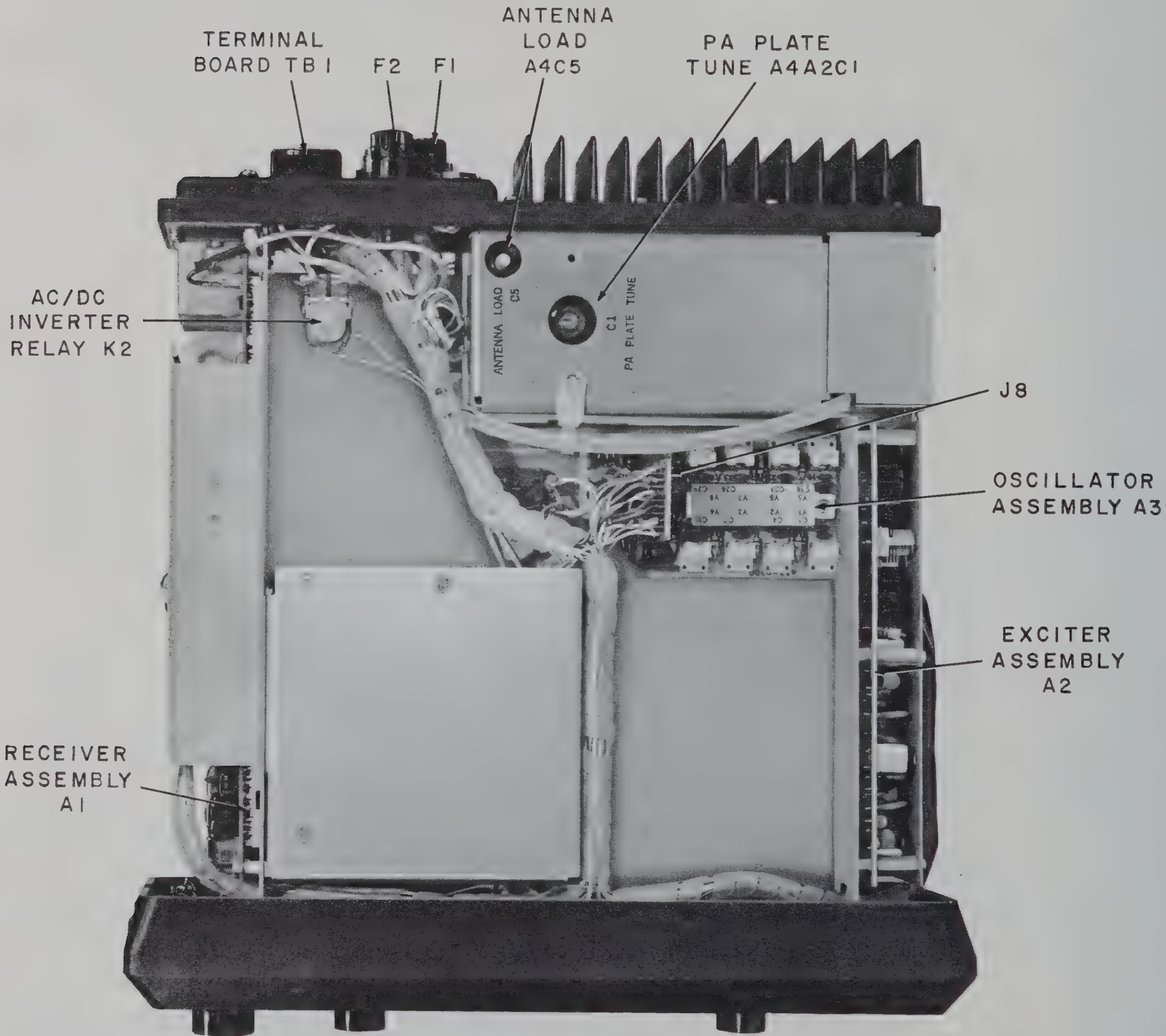
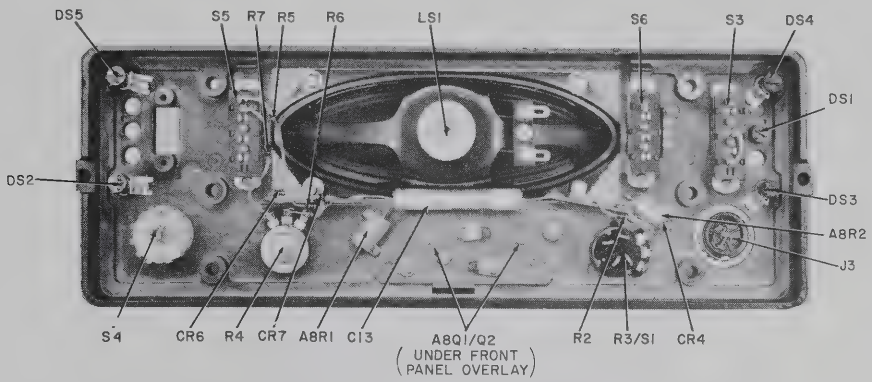
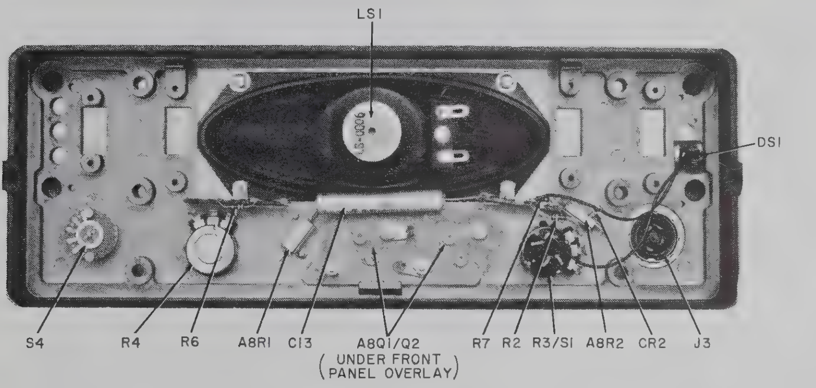


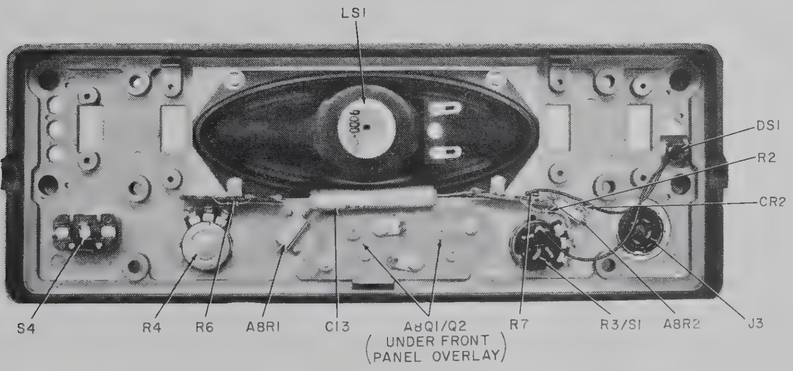
FIGURE 4. 4 - RF-403-2 BOTTOM VIEW



(A) RF-401-2 AND RF-404-3



(B) RF-403-2 (4-CHANNEL)



(C) RF-403-2 (2-CHANNEL)

FIGURE 4.5 - FRONT PANEL PARTS LOCATION (REAR VIEW)

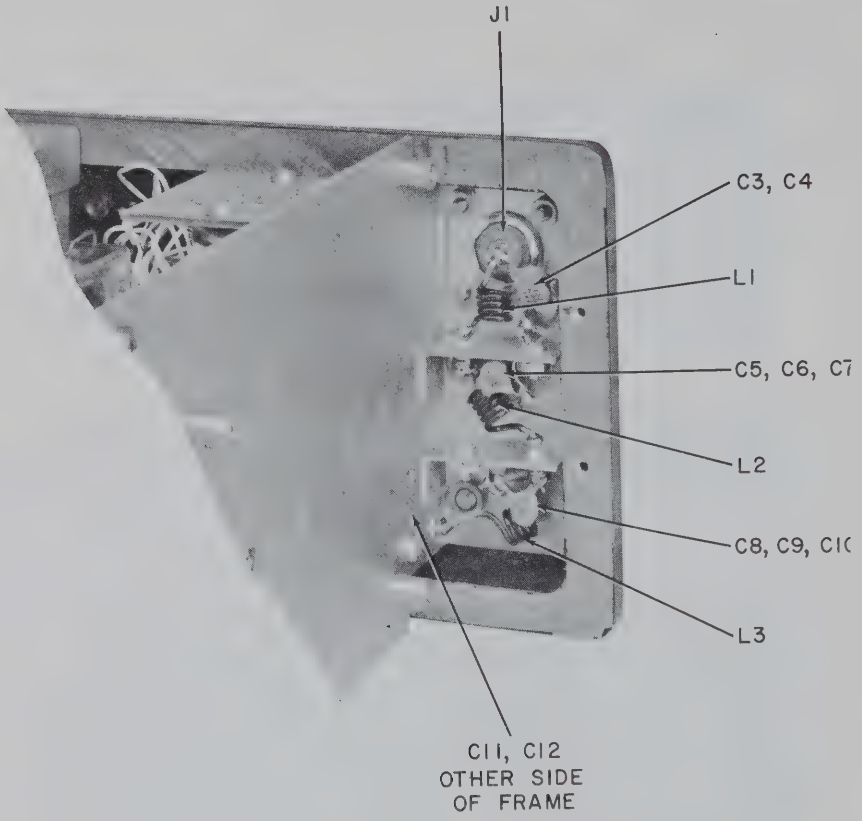
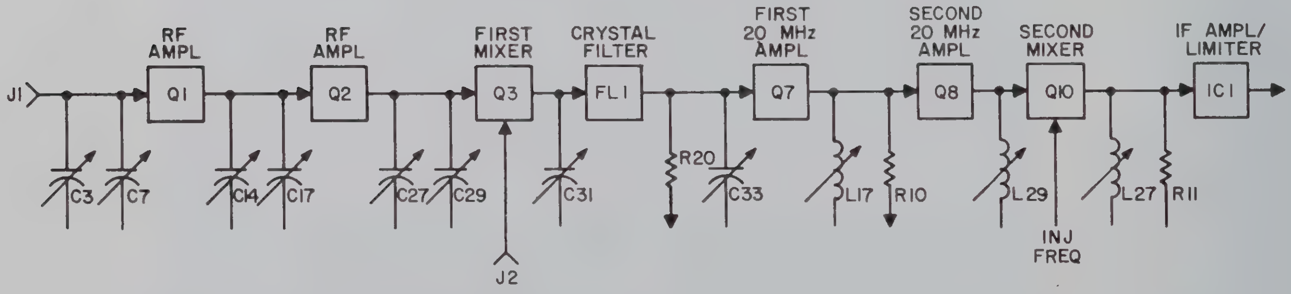
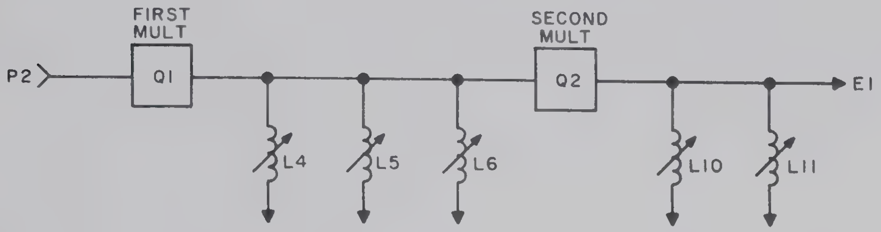


FIGURE 4. 6 - ANTENNA LOW-PASS FILTER PARTS LOCATION



STEP	INPUT AT J1	TEST EQUIPMENT AND TEST POINT	INDICATION
1	CHANNEL FREQUENCY 10 mV	RF VOLTMETER ACROSS R20 TO COMMON	80 mV MIN
2	CHANNEL FREQUENCY 10 mV	RF VOLTMETER ACROSS R10 TO COMMON	80 mV MIN
3	NO INPUT	RF VOLTMETER AT BASE OF Q10 TO COMMON	60 mV MIN
4	CHANNEL FREQUENCY 100μV	RF VOLTMETER ACROSS R11 TO COMMON	200 mV MIN

FIGURE 4. 7 - RECEIVER ASSEMBLY A1 GAIN MEASUREMENT



STEP	TEST EQUIPMENT AND TEST POINT	INDICATION
1	RF VOLTMETER ACROSS P2 AND P3	1 V MIN
2	RF VOLTMETER ACROSS E1 AND E2	400 mV MIN

FIGURE 4. 8 - MULTIPLIER ASSEMBLY A7 GAIN MEASUREMENT

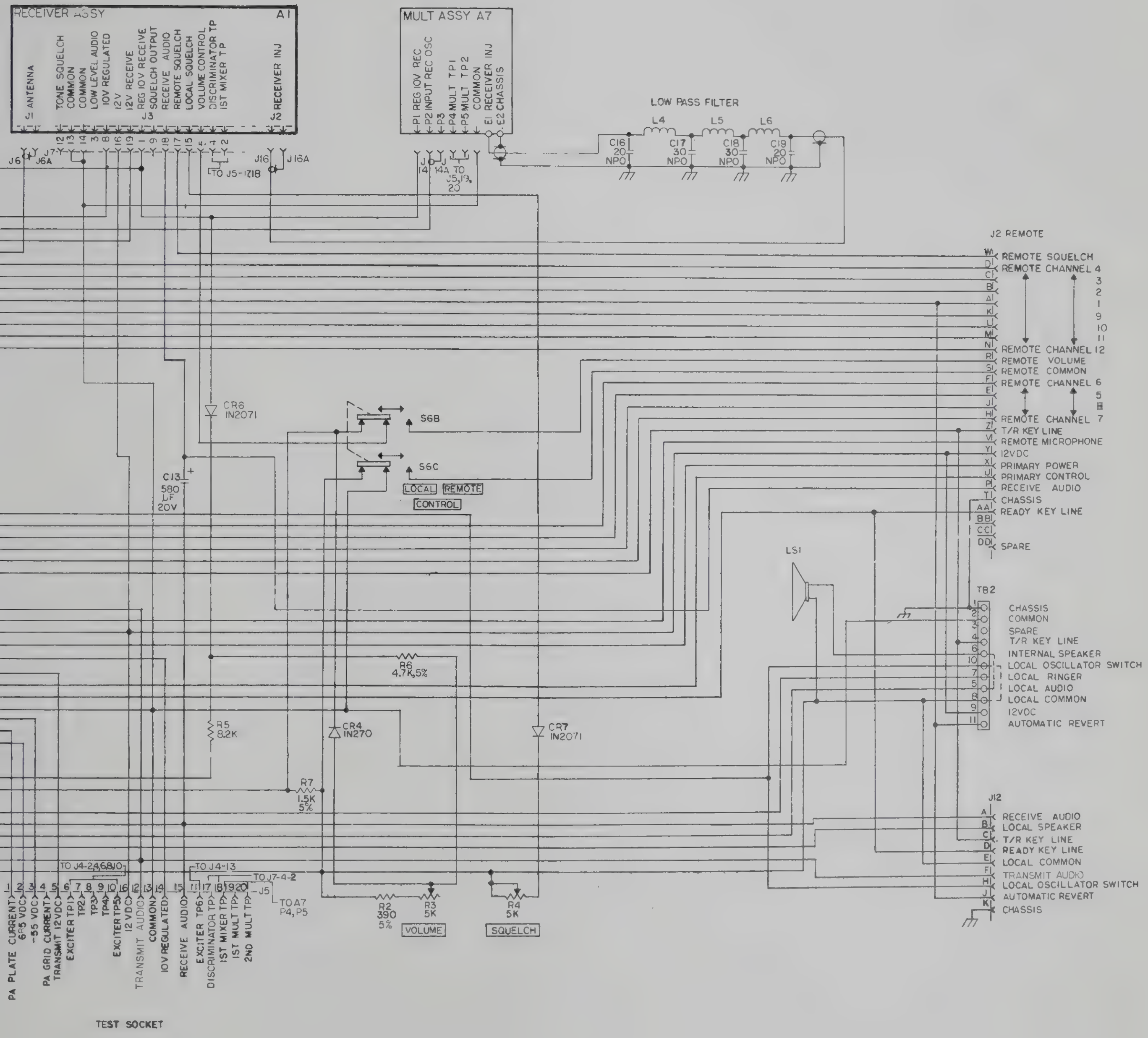
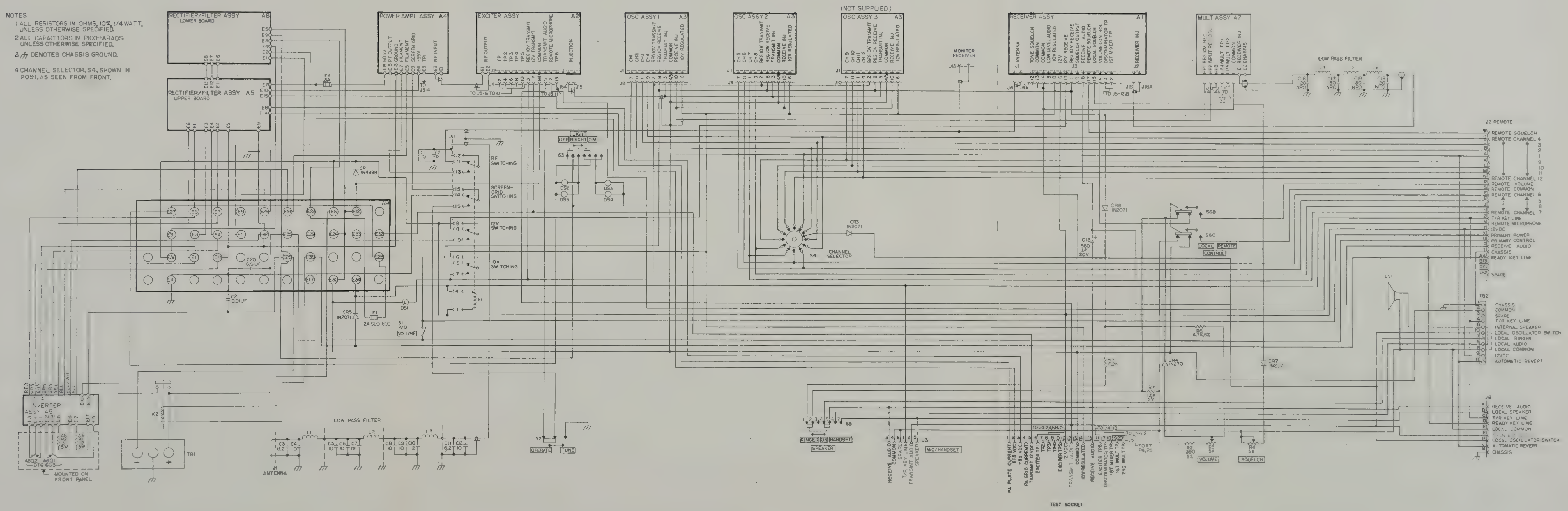


FIGURE 4. 9 - RF-401-2 MAIN FRAME SCHEMATIC DIAGRAM



NOTES
1 ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
2 ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED.
3 ⏚ DENOTES CHASSIS GROUND.
4 CHANNEL SELECTOR, S4, SHOWN IN POS-1, AS SEEN FROM FRONT.

FIGURE 4.9 - RF-401-2 MAIN FRAME SCHEMATIC DIAGRAM

DESCRIPTION	RF PART NUMBER
Disc, O, 20 pf, 5%, VDCW	C-4745
Disc, Cer, 1 uf, +60%, -40%, VDCW	C-0065
Disc, Cer, 1 uf, +60%, -40%, VDCW	C-0065
, 1N4998	CR-0666
, 1N2071	CR-0001
, 1N2071	CR-0001
, 1N270	CR-0047
, 1N2071	CR-0001
, 1N2071	CR-0001
, 1N2071	CR-0001
Transmit	DS-0073
Panel	DS-0077
2.0 amp, -Blo	F-0026
0.5 amp,	F-0008
25.0 amp, V, 3 AG	F-0019
ctor	J-0003
ctor	J-0816
ctor	J-0505
ctor	483-0252
t, Test	J-0830
ctor	MP-3988
ctor	483-0201
ctor	483-0308
ctor	483-0308
ctor	483-0308
t, Relay	X-1005
ctor	J-0827
ctor	J-0823
ctor	MP-3988
ctor	MP-3988
ctor	MP-3988
, transmit/receive, -volt dc	K-0069
, Converter, -volt dc	K-0066
or	483-0391
or	483-0392
or	483-0391
ssembly	483-0216
ssembly	483-0216
ssembly	483-0216
er, ohms at 400 Hz	LS-0006
POWER ADJUST trol, W.W., K, 5W	R-3890
comp, ohm, 5%, 1/4W	R-1239
ME control, , 30%, dio Log taper with ST switch	R-3888
LCH control, , 30%, near taper	R-3889
comp, K, 10%, 1/4W	R-0035

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
	RF-401-2 MAIN FRAME				
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265			
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253			
S1	Power switch, see R3				
S2	TUNE/OPERATE switch	S-0274			
S3	LIGHT switch	S-0273			
S4	Channel Selector switch	A483-0089			
S5	SPEAKER switch	S-0273			
S6	CONTROL switch	S-0272			
TB1	Terminal Block, 3 terminals	TB-0473			
TB2	Terminal Block, 11 terminals	TB-0507			
XDS1 Through XDS5	Socket, light	X-1011			
XF1	Fuse holder	X-1006			
XF2	Fuse holder	X-1006			

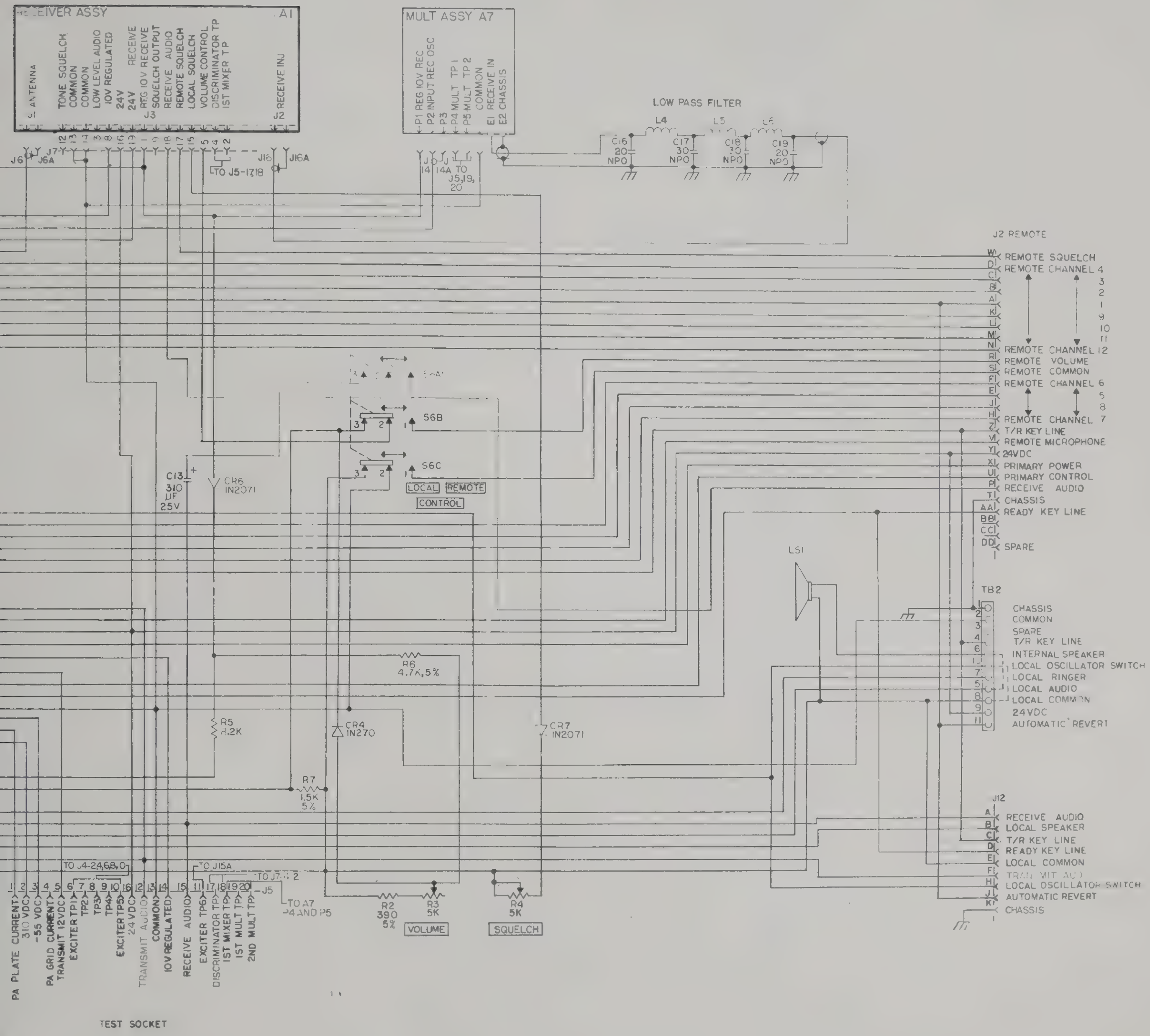


FIGURE 4. 10 - RF-404-3 MAIN FRAME SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RF-401-2 MAIN FRAME		
A1	Receiver Assembly, see separate parts list	484-0199
A2	Exciter Assembly, see separate parts list	484-0250
A3	Oscillator Unit, see separate parts list	483-0300
A4	PA Assembly, see separate parts list	483-0150
A5	Rectifier/Filter Assembly, see separate parts list	483-0360
A6	Rectifier/Filter Assembly, see separate parts list	483-0355
A7	Multiplier Assembly, see separate parts list	483-0218
A8	13.6 Volt Dc/Ac Inverter, see separate parts list	484-0410
A9	Junction Board	483-0500
C1	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C2	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C3	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C4	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C5	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C6	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C7	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C9	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C10	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C11	Cap, Cer, NPO, 8.2 pf, 5% 1 KVDCW	C-4740
C12	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C13	Cap, Alum., Elect., 580 uf, -10%, +75%, 15 VDCW	C-4924
C14	Not used	
C15	Not used	
C16	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C17	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C18	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4749
C19	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C20	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C21	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N2071	CR-0001
CR3	Diode, 1N2071	CR-0001
CR4	Diode, 1N270	CR-0047
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
DS1	Light, Transmit	DS-0073
DS2 Through DS5	Light, Panel	DS-0077
F1	Fuse, 2.0 amp, Slo-Blo	F-0026
F2	Fuse, 0.5 amp,	F-0008
F3	Fuse, 25.0 amp, 32 V, 3 AG	F-0019
J1	Connector	J-0003
J2	Connector	J-0816
J3	Connector	J-0505
J4	Connector	483-0252
J5	Socket, Test	J-0830
J6	Connector	MP-3988
J7	Connector	483-0201
J8	Connector	483-0308
J9	Connector	483-0308
J10	Connector	483-0308
J11	Socket, Relay	X-1005
J12	Connector	J-0827
J13	Connector	J-0823
J14	Connector	MP-3988
J15	Connector	MP-3988
J16	Connector	MP-3988
K1	Relay, transmit/receive, 12-volt dc	K-0069
K2	Relay, Converter, 12-volt dc	K-0066
L1	Inductor	483-0391
L2	Inductor	483-0392
L3	Inductor	483-0391
L4	Coil Assembly	483-0216
L5	Coil Assembly	483-0216
L6	Coil Assembly	483-0216
LS1	Speaker, 3.2 ohms at 400 Hz	LS-0006
R1	LOW POWER ADJUST control, W.W., 10K, 5W	R-3890
R2	Res, comp, 390 ohm, 5%, 1/4W	R-1239
R3	VOLUME control, 5K, 30%, Audio Log taper with DPST switch	R-3888
R4	SQUELCH control, 5K, 30%, Linear taper	R-3889
R5	Res, comp, 8.2K, 10%, 1/4W	R-0035
RF-401-2 MAIN FRAME		
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253
S1	Power switch, see R3	
S2	TUNE/OPERATE switch	S-0274
S3	LIGHT switch	S-0273
S4	Channel Selector switch	A483-0089
S5	SPEAKER switch	S-0273
S6	CONTROL switch	S-0272
TB1	Terminal Block, 3 terminals	TB-0473
TB2	Terminal Block, 11 terminals	TB-0507
XDS1 Through XDS5	Socket, light	X-1011
XF1	Fuse holder	X-1006
XF2	Fuse holder	X-1006

NOTES

1 ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.

2 ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED.

3 ⏚ DENOTES CHASSIS GROUND.

4 CHANNEL SELECTOR, S4, SHOWN IN POS 1, AS SEEN FROM FRONT.

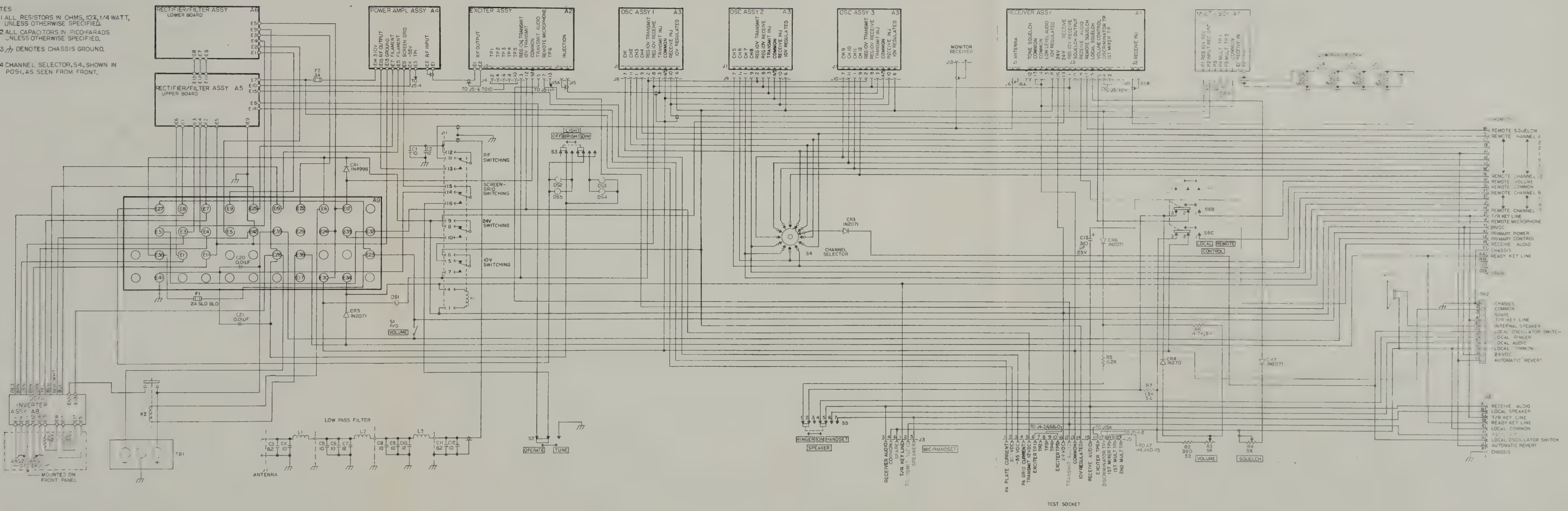
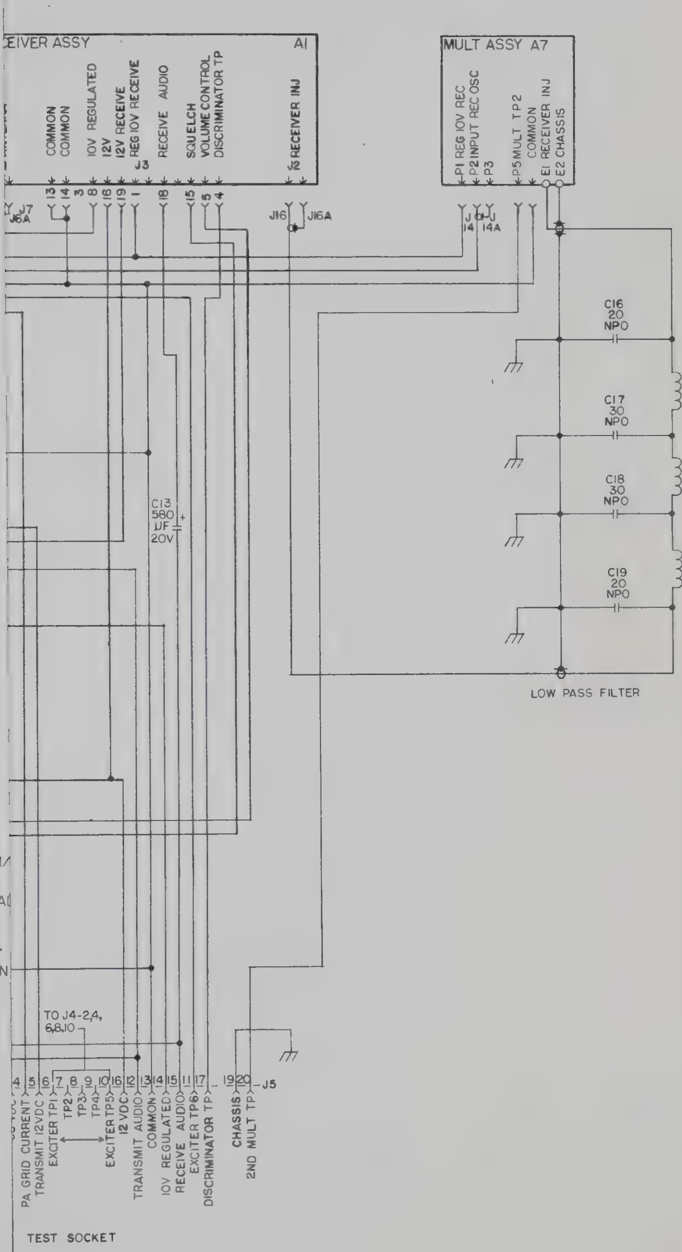


FIGURE 4. 10 - RF-404-3 MAIN FRAME SCHEMATIC DIAGRAM

ESCRIPTION	RF PART NUMBER
Disc, O, 20 pf, 5%, VDCW	C-4745
Disc, Cer, 1 uf, +60%, -40%, VDCW	C-0065
Disc, Cer, 1 uf, +60%, -40%, VDCW	C-0065
1N4998	CR-0666
1N2071	CR-0001
1N2071	CR-0001
1N270	CR-0047
1N2071	CR-0001
1N2071	CR-0001
1N2071	CR-0001
Transmit	DS-0074
Panel	DS-0078
2.0 amp, -Blo	F-0026
0.3 amp,	F-0006
10.0 amp, , 3 AG	F-0022
ctor	J-0003
ctor	J-0816
ctor	J-0505
ctor	483-0252
, Test	J-0830
ctor	MP-3988
ctor	483-0201
ctor	483-0308
ctor	483-0308
ctor	483-0308
, Relay	X-1005
ctor	J-0827
ctor	J-0823
ctor	MP-3988
ctor	MP-3988
ctor	MP-3988
transmit/receive, volt dc	K-0070
Converter, volt dc	K-0067
or	483-0391
or	483-0392
or	483-0391
ssembly	483-0216
ssembly	483-0216
ssembly	483-0216
r, ohms at 400 Hz	LS-0007
POWER ADJUST trol, W.W., , 5W	R-3980
omp, ohm, 5%, 1/4W	R-1239
ME control, 30%, io Log taper with ST switch	R-3888
LCH control, 30%, ear taper	R-3889
omp, K, 10%, 1/4W	R-0035

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
RF-404-3 MAIN FRAME					
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265			
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253			
S1	Power switch, see R3				
S2	TUNE/OPERATE switch	S-0274			
S3	LIGHT switch	S-0273			
S4	Channel Selector switch	A483-0089			
S5	SPEAKER switch	S-0273			
S6	CONTROL switch	S-0272			
TB1	Terminal Block, 3 terminals	TB-0473			
TB2	Terminal Block, 11 terminals	TB-0507			
XDS1 Through XDS5	Socket, light	X-1011			
XF1	Fuse holder	X-1006			
XF2	Fuse holder	X-1006			



NOTES

1 ALL RESISTORS IN OHMS, 10%, 1/
OTHERWISE SPECIFIED.

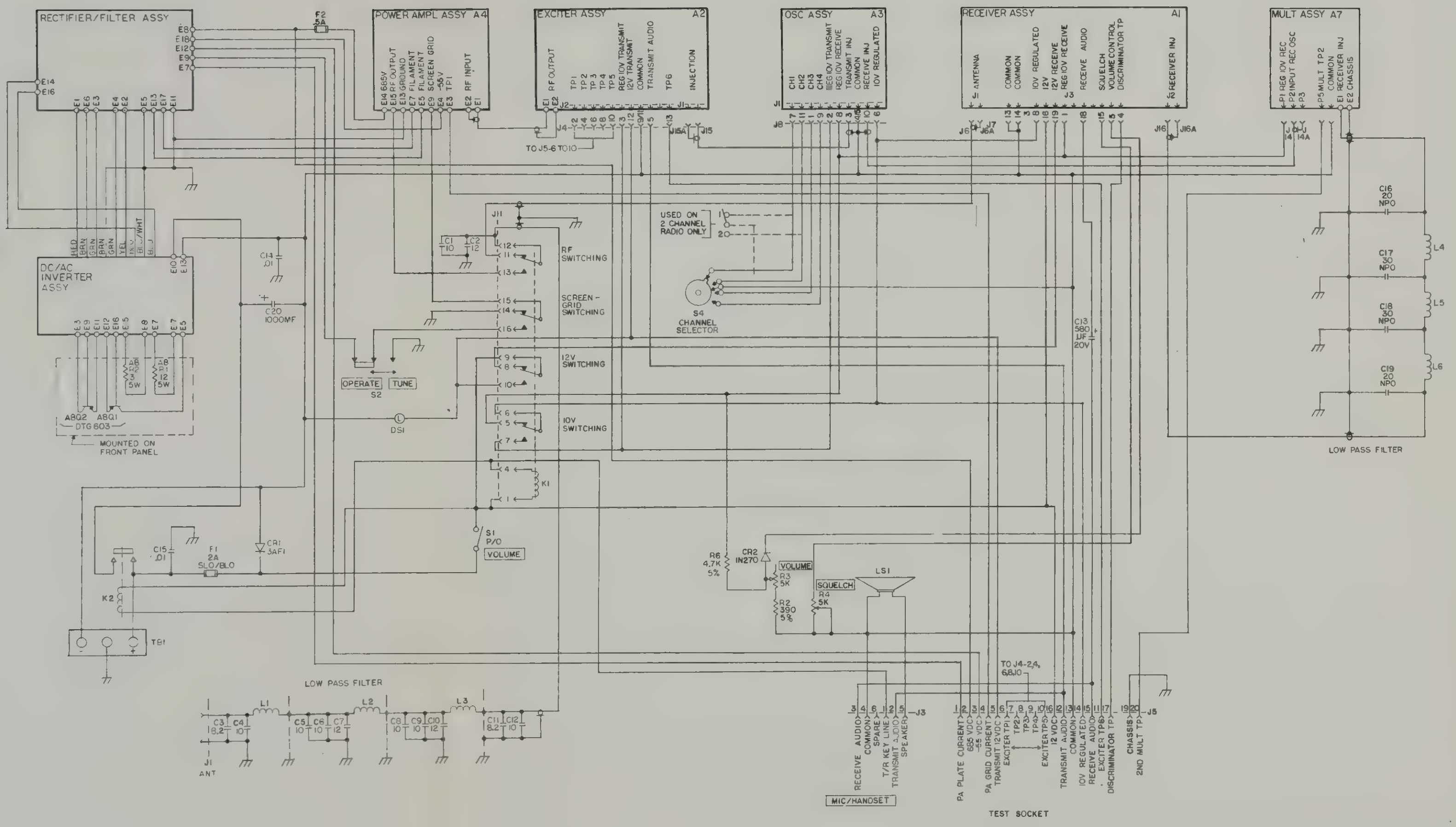
2 ALL CAPACITORS IN PICO-FARA
OTHERWISE SPECIFIED.

3 ⏚ DENOTES CHASSIS GROUND.

4 CHANNEL SELECTOR, S4, SHOWN
SEEN FROM FRONT.

FIGURE 4. 11 - RF-403-2 MAIN FRAME SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RF-404-3 MAIN FRAME		
A1	Receiver Assembly, see separate parts list	484-0199
A2	Exciter Assembly, see separate parts list	484-0250
A3	Oscillator Unit, see separate parts list	483-0300
A4	PA Assembly, see separate parts list	483-0150
A5	Rectifier/Filter Assembly, see separate parts list	483-0360
A6	Rectifier/Filter Assembly, see separate parts list	483-0355
A7	Multiplier Assembly, see separate parts list	483-0218
A8	27.5 Volt Dc/Ac Inverter see separate parts list	
A9	Junction Board	483-0500
C1	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C2	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C3	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C4	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C5	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C6	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C7	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C9	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C10	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C11	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C12	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C13	Cap, Alum, Elect., 310 uf, -10%, +75%, 25 VDCW	C-4925
C14	Not used	
C15	Not used	
C16	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C17	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C18	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4749
C19	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C20	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C21	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N2071	CR-0001
CR3	Diode, 1N2071	CR-0001
CR4	Diode, 1N270	CR-0047
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
DS1	Light, Transmit	DS-0074
DS2 Through DS5	Light, Panel	DS-0078
F1	Fuse, 2.0 amp, Slo-Blo	F-0026
F2	Fuse, 0.3 amp,	F-0006
F3	Fuse, 10.0 amp, 32V, 3 AG	F-0022
J1	Connector	J-0003
J2	Connector	J-0816
J3	Connector	J-0505
J4	Connector	483-0252
J5	Socket, Test	J-0830
J6	Connector	MP-3988
J7	Connector	483-0201
J8	Connector	483-0308
J9	Connector	483-0308
J10	Connector	483-0308
J11	Socket, Relay	X-1005
J12	Connector	J-0827
J13	Connector	J-0823
J14	Connector	MP-3988
J15	Connector	MP-3988
J16	Connector	MP-3988
K1	Relay, transmit/receive, 24-volt dc	K-0070
K2	Relay, Converter, 24-volt dc	K-0067
L1	Inductor	483-0391
L2	Inductor	483-0392
L3	Inductor	483-0391
L4	Coil Assembly	483-0216
L5	Coil Assembly	483-0216
L6	Coil Assembly	483-0216
LS1	Speaker, 16 ohms at 400 Hz	LS-0007
R1	LOW POWER ADJUST control, W.W., 10K, 5W	R-3980
R2	Res, comp, 390 ohm, 5%, 1/4W	R-1239
R3	VOLUME control, 5K, 30%, Audio Log taper with DPST switch	R-3888
R4	SQUELCH control, 5K, 30%, Linear taper	R-3889
R5	Res, comp, 8.2K, 10%, 1/4W	R-0035
RF-404-3 MAIN FRAME		
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253
S1	Power switch, see R3	
S2	TUNE/OPERATE switch	S-0274
S3	LIGHT switch	S-0273
S4	Channel Selector switch	A483-0089
S5	SPEAKER switch	S-0273
S6	CONTROL switch	S-0272
TB1	Terminal Block, 3 terminals	TB-0473
TB2	Terminal Block, 11 terminals	TB-0507
XDS1 Through XDS5	Socket, light	X-1011
XF1	Fuse holder	X-1006
XF2	Fuse holder	X-1006



NOTES

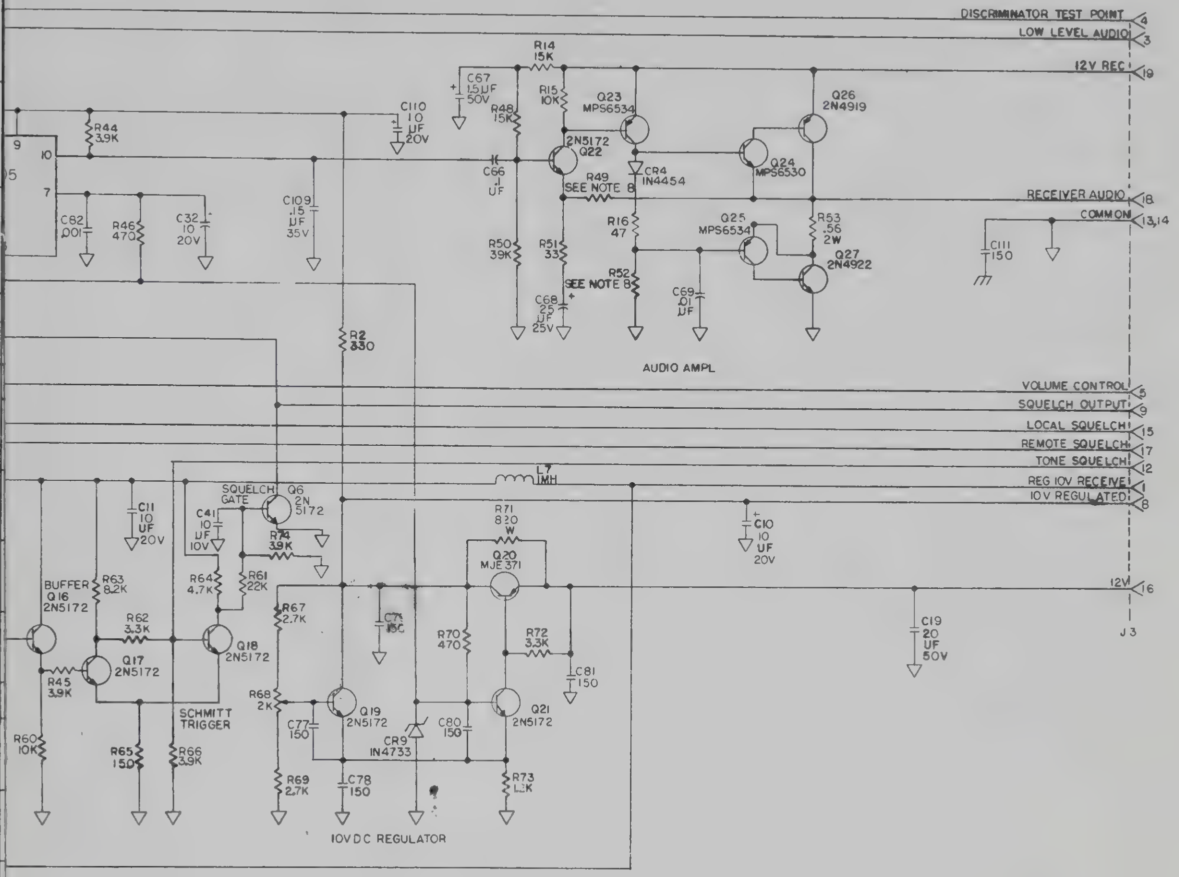
1 ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
2 ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED.
3 ⏚ DENOTES CHASSIS GROUND.
4 CHANNEL SELECTOR, S4, SHOWN IN POS-1, AS SEEN FROM FRONT.

FIGURE 4. 11 - RF-403-2 MAIN FRAME SCHEMATIC DIAGRAM

SCRIPTION	RF PART NUMBER
sc, , 20 pf, 5%, DCW	C-4745
sc, , 20 pf, 5%, DCW	C-4745
um., Elec., uf, +50%, -10%, DCW	C-4655
3AF1	CR-0079
1N270	CR-0047
Transmit	DS-0073
.0 amp, Blo	F-0026
.5 amp	F-0008
5.0 amp, , 3 AG	F-0019
connector d	J-0003
or	J-0505
or	483-0252
Test	J-0830
or or	MP-3938
or	483-0201
d d	483-0308
Relay d d	X-1005
or	MP-3988
or	MP-3988
or	MP-3988
ransmit/receive, c	K-0069
onverter, c	K-0066
	483-0391
	483-0392
	483-0391
embly	483-0216
embly	483-0216
embly	483-0216
ms at 400 Hz	LS-0006
np, m, 5%, 1/4W	R-1239
control, 0%, Log Taper with switch	R-3888
H control, 0%, r taper	R-3889
np, 5%, 1/4W	R-1265
np, 5%, 1/4W	R-1253
vitch, part of R3	
PERATE switch	S-0279
n channel selector	A797-0059
n channel selector	S-0050

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
RF-403-2 MAIN FRAME					
TB1	Terminal Block, 3 terminals	TB-0433			
XDS1	Socket, light, transmit	X-1011			
XF1	Fuse holder	X-1006			
XF2	Fuse holder	X-1006			

Stage
Q1
Q2
Q3
Q6
Q7
Q8
Q9
Q10
Q11
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22



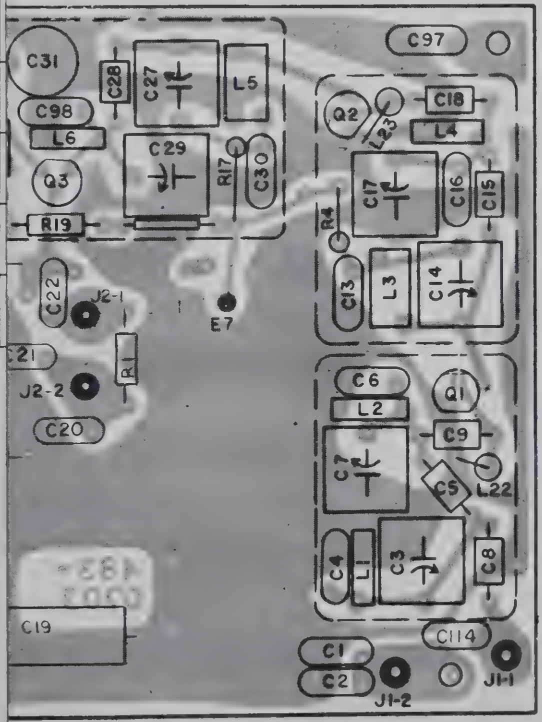


FIGURE 4. 12 - RECEIVER ASSEMBLY A1
SCHEMATIC DIAGRAM

FOIL)

REF DESIG	DESCRIPTION	RF PART NUMBER
RF-403-2 MAIN FRAME		
A1	Receiver Assembly, see separate parts list	484-0199
A2	Exciter Assembly, see separate parts list	484-0250
A3	Oscillator Assembly, 4-channel, see separate parts list	483-0300
	Oscillator Assembly, 2-channel, see separate parts list	483-0301
A4	PA Assembly, see separate parts list	483-0150
A5	Rectifier/Filter Assembly, see separate parts list	484-0095
A6	Not used	
A7	Multiplier Assembly, see separate parts list	483-0218
A8	13.6 Volt Dc/Ac Inverter see separate parts list	484-0410
C1	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C2	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C3	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C4	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C5	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C6	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C7	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C9	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C10	Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C11	Cap, Cer, NPO, 8.2 pf, 5%, 1 KVDCW	C-4740
C12	Cap, Cer, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C13	Cap, Alum., Elect., 580 uf, -10%, +75%, 15 VDCW	C-4929
C14	Cap, Disc, Cer, 0.01 uf, +60%, - 40%, 150 VDCW	C-0065
C15	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C16	Cap, Disc, NPO,.20 pf, 5%, 1 KVDCW	C-4745
C17	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C18	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C19	Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C20	Cap, Alum., Elec., 1000 uf, +50%, -10%, 20 VDCW	C-4655
CR1	Diode, 3AF1	CR-0079
CR2	Diode, 1N270	CR-0047
DS1	Light, Transmit	DS-0073
F1	Fuse, 2.0 amp, Slo-Blo	F-0026
F2	Fuse, 0.5 amp	F-0006
F3	Fuse, 25.0 amp, 32 V, 3 AG	F-0019
J1	Antenna connector	J-0003
J2	Not used	
J3	Connector	J-0505
J4	Connector	483-0252
J5	Socket, Test	J-0830
J6	Connector	MP-3938
J7	Connector	
J8	Connector	483-0201
J9	Not used	483-0308
J10	Not used	
J11	Socket, Relay	X-1005
J12	Not used	
J13	Not used	
J14	Connector	MP-3988
J15	Connector	MP-3988
J16	Connector	MP-3988
K1	Relay, transmit/receive, 12 vdc	K-0069
K2	Relay, converter, 12 vdc	K-0066
L1	Inductor	483-0391
L2	Inductor	483-0392
L3	Inductor	483-0391
L4	Coil Assembly	483-0216
L5	Coil Assembly	483-0216
L6	Coil Assembly	483-0216
LS1	Speaker, 3.2 ohms at 400 Hz	LS-0006
R1	Not used	
R2	Res, comp, 390 ohm, 5%, 1/4W	R-1239
R3	VOLUME control, 5K, 30%, Audio Log Taper with DPST switch	R-3888
R4	SQUELCH control, 5K, 30%, Linear taper	R-3889
R5	Not used	
R6	Res, comp, 4.7K, 5%, 1/4W	R-1265
R7	Res, comp, 1.5K, 5%, 1/4W	R-1253
S1	Power switch, part of R3	
S2	TUNE OPERATE switch	S-0279
S3	Not used	
S4	4-position channel selector switch	A797-0059
	2-position channel selector switch	S-0050
RF-403-2 MAIN FRAME		
TB1	Terminal Block, 3 terminals	TB-0433
XDS1	Socket, light, transmit	X-1011
XF1	Fuse holder	X-1006
XF2	Fuse holder	X-1006

RECEIVER BOARD A1, VOLTAGE/RESESTANCE CHART

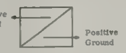
Stage	Voltage (DC)			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
	Gate	Source	Drain	Gate	Source	Drain
Q1	0	0	+9	0 [illegible]	.2Ω .2Ω	100Ω (1) 17Ω (1)
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	[illegible]	0	+9	0 [illegible]	.2Ω 2Ω	100Ω(1) 18Ω (1)
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	[illegible]	–	+6	[illegible]	600Ω 600Ω	600Ω [illegible]Ω
Q6	[illegible] to [illegible]	—	0 to +1.0	750Ω (2) 7K (2)	[illegible] 0	[illegible] 5K (2)
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	0	[illegible]	+9.6	0 (1) 0 (1)	100Ω (1) 18Ω (1)	25Ω (1) 20Ω (1)
[illegible]	4.[illegible]	[illegible]	6	100K (2) [illegible]K (2)	1K (2) [illegible].4K (2)	0 (1) 0 (1)
[illegible]	4.[illegible]	+.4	+6.4	[illegible]K (2) 5K (2)	1.2K (2) 1K (2)	[illegible]6Ω (2) 200Ω (2)
[illegible]	+4.6	+4.[illegible]	+10	1K (2) [illegible]	[illegible]2K (2) 1K (2)	[illegible]Ω (2) [illegible]
	Gate	Source	Drain	Gate	Source	Drain
[illegible]	[illegible]1	-2	+10	[illegible]3K (2) [illegible]	200Ω (2) 200Ω (2)	[illegible]Ω (1) [illegible]Ω
[illegible]	-1.[illegible]	+1.[illegible]	+[illegible]	[illegible] 5K (2)	[illegible]Ω (2) 460Ω (2)	[illegible] 1K (2)
[illegible]	-2 to +1.6	0 to -1.[illegible]	-10	[illegible]Ω [illegible]4K (2)	4[illegible]K (2) [illegible] (2)	90Ω 90Ω (2)
[illegible]	0 to +[illegible]	+.[illegible] to +.4	+1.5 to +3.4	1K (2) 7.0K (2)	140Ω(1) 140Ω (1)	[illegible]5K (2) 2.8K (2)
Q18	+.15 to +1.0	+.15 to +.40	+.45 to +8.2	900 (2) 2.8K (2)	140Ω(1) 140Ω (1)	3.9K (2) 2K (2)
Q19	+5	+4.4	+10	1.8K (2) 2.6K (2)	1.3K(2) 1.2K (2)	2.2K(2) [illegible]6K (2)
Q20	+13	+13	+10	5.5K (2) [illegible]K (2)	2.2K (2) 5K (2)	[illegible] [illegible]K (2)
Q2[illegible]	+5	+4.4	+13	2.2K (2) [illegible]K (2)	1.4K (2) [illegible]K (2)	[illegible]K (2) [illegible]K
Q22	+6.4	+6.4	+13	19K (3) 40K (3)	3K (2) 50K (2)	[illegible] [illegible]

RECEIVER BOARD A1, VOLTAGE/RESISTOR CHART (Continued)

Stage	Voltage (DC)			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
Q23	+12	+13	+6.6	44K (3) 44K (3)	38K (3) 50K (3)	2.6K (2) 3M (3)
Q24	+6.6	+6.2	+13	2.6K (2) >1M (3)	700 Ω (2) >1M (3)	∞ (3) >50K (3)
Q25	-5.6	+6.2	+.3	1K (2) 1K (2)	700 Ω (2) >40K (3)	700 Ω (2) 10M (3)
Q26	+13	+13	+6.2	∞ (3) >50K (3)	>20K (3) >40K (3)	700 Ω (2) >40K (3)
Q27	+.3	—	+6.2	700 Ω (2) 10M (3)	0 (1) 0 (1)	700 Ω (2) >40K (3)

NOTES:

1. Resistance



(1) R x 1 range
(2) R x 100 range
(3) R x 10,000 range

2. Measurements made with Simpson Model 260 VOM under no signal condition.

3. Measurements shown are actual readings and may vary by 15%.

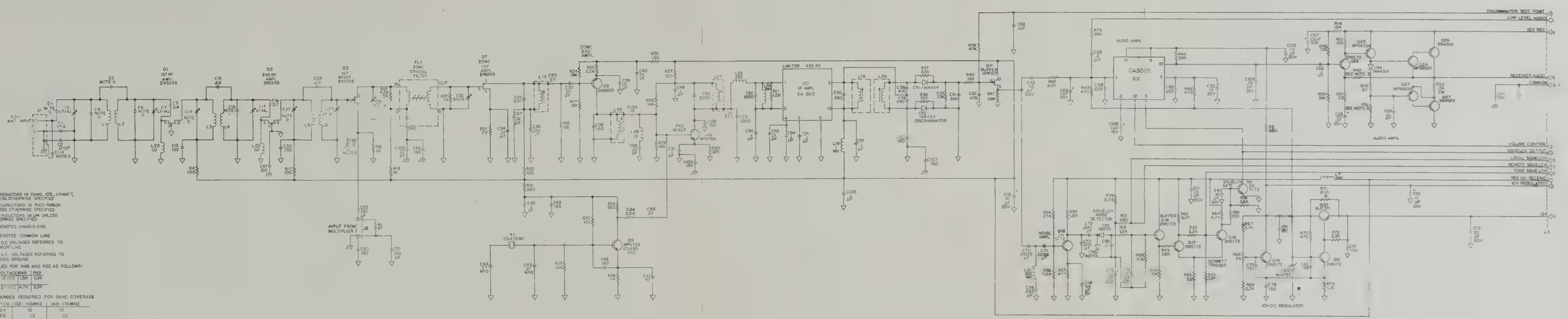
4. Resistance measurements made with board disconnected.

IC1

PIN	VOLTAGE (DC)	RESISTANCE
1	2.1	1.1K 2.4K
2	2.1	1.1K 2.4K
3	2.2	1.1K 2.4K
4	2.2	900Ω 1.2K
5	9.8	95Ω 22Ω
8	0	0 0
10	9.8	100Ω 19Ω

IC2

PIN	VOLTAGE (DC)	RESISTANCE	PIN	VOLTAGE (DC)	RESISTANCE
1	4.8	3K 1.7K	7	4.8	3K 1.7K
2	4.2	1.4M 12K	9	10.0	2.8K 2K
3	0.6	10K 20K	10	8.2	8.5K 5K
5	025	8K 3.5K	11	10.0	2.8K 2K
6	075	9K 4K	12	75	12K 22K

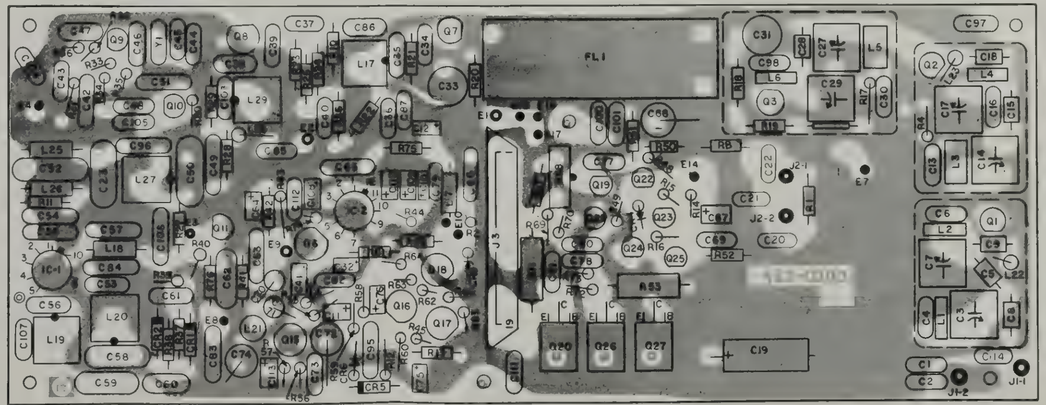


NOTES
1 ALL RESISTORS IN OHMS, 10%, 1/4 WATT, UNLESS OTHERWISE SPECIFIED
2 ALL CAPACITORS IN PICO-FARADS UNLESS OTHERWISE SPECIFIED
3 ALL INDUCTORS IN UH UNLESS OTHERWISE SPECIFIED
4 ⏚ DENOTES CHASSIS GND
5 ▽ DENOTES COMMON LINE
6 ALL DC VOLTAGES REFERRED TO "COMMON" LINE
7 ALL AC VOLTAGES REFERRED TO CHASSIS GROUND
8 VALUES FOR R49 AND R52 AS FOLLOWS:

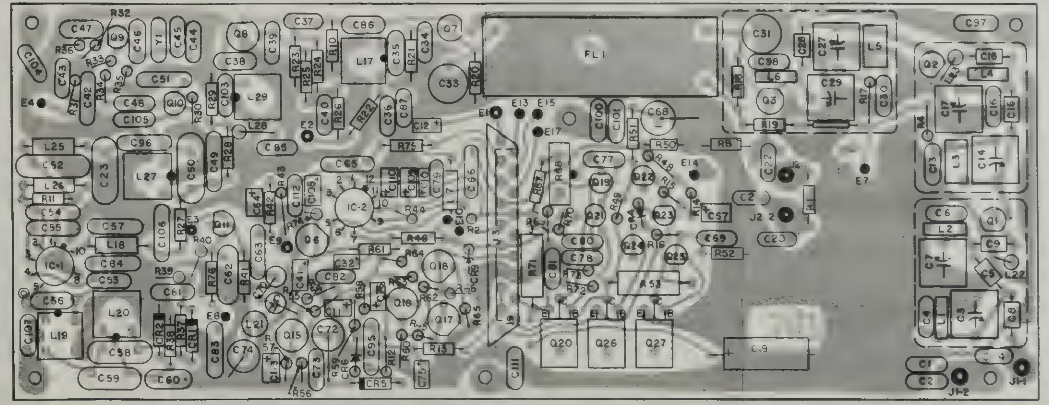
VOLTAGE	R49	R52
12 VDC	1.5K	10K
27 VDC	4.7K	3.3K

9 CHANGES REQUIRED FOR BAND COVERAGE

ITEM	132-148MHZ	148-174MHZ
C4	18	12
C5	1.2	1.0
C6	25	12
C8	5.6	4.7
C18	15	12
C98	22	12
C114	25	20
C14	1.7-14	1.3-6.7
C27	1.7-14	1.3-6.7



RECEIVER ASSEMBLY A1 COMPONENT LOCATION (UPPER FOIL)



RECEIVER ASSEMBLY A1 COMPONENT LOCATION (LOWER FOIL)

FIGURE 4.12 – RECEIVER ASSEMBLY A1 SCHEMATIC DIAGRAM

	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
		RECEIVER ASSEMBLY A1					
/	R-0039	R57	Res, comp, 470 ohm, 10%, 1/4W	R-0020			
W	R-0025	R58	Res, comp, 2.2K, 10%, 1/4W	R-0028			
1/4W	R-0018	R59	Res, comp, 10K, 10%, 1/4W	R-0036			
/	R-0036	R60	Res, comp, 10K, 10%, 1/4W	R-0036			
1/4W	R-0021	R61	Res, comp, 22K, 10%, 1/4W	R-0040			
/	R-0028	R62	Res, comp, 3.3K, 10%, 1/4W	R-0030			
/	R-0036	R63	Res, comp, 8.2K, 10%, 1/4W	R-0035			
	R-0024	R64	Res, comp, 4.7K, 10%, 1/4W	R-0032			
/	R-0040	R65	Res, comp, 150 ohm, 10%, 1/4W	R-0014			
/	R-0040	R66	Res, comp, 3.9K, 10%, 1/4W	R-0031			
/	R-0042	R67	Res, comp, 2.7K, 10%, 1/4W	R-0029			
/	R-0039	R68	Res, Var, 2K	R-3713			
W	R-0031	R69	Res, comp, 2.7K, 10%, 1/4W	R-0029			
W	R-0030	R70	Res, comp, 470 ohm, 10%, 1/4W	R-0020			
1/4W	R-0020	R71	Res, comp, 820 ohm, 10%, 1/4W	R-0223			
W	R-0031	R72	Res, comp, 3.3K, 10%, 1/4W	R-0030			
W	R-0031	R73	Res, comp, 1.2K, 10%, 1/4W	R-0025			
1/4W	R-0020	R74	Res, comp, 3.9K, 10%, 1/4W	R-0031			
	R-0038	R75	Res, comp, 39K, 10%, 1/4W	R-0043			
		R76	Res, comp, 47K, 10%, 1/4W	R-0044			
V	R-0026	Y1	Crystal, Frequency, 20.455 MHz	Y-0910			
V	R-0030		RFI shield (first rf stage)	B483-0235			
			RFI shield (second rf stage)	B483-0235			
V	R-0026		RFI shield (first mixer stage)	B483-0237			
	R-0043						
4W	R-0006						
	R-0024						
V	R-0032						
	R-0024						
2W	R-3845						
	R-0041						
	R-0024						
V	R-0033						

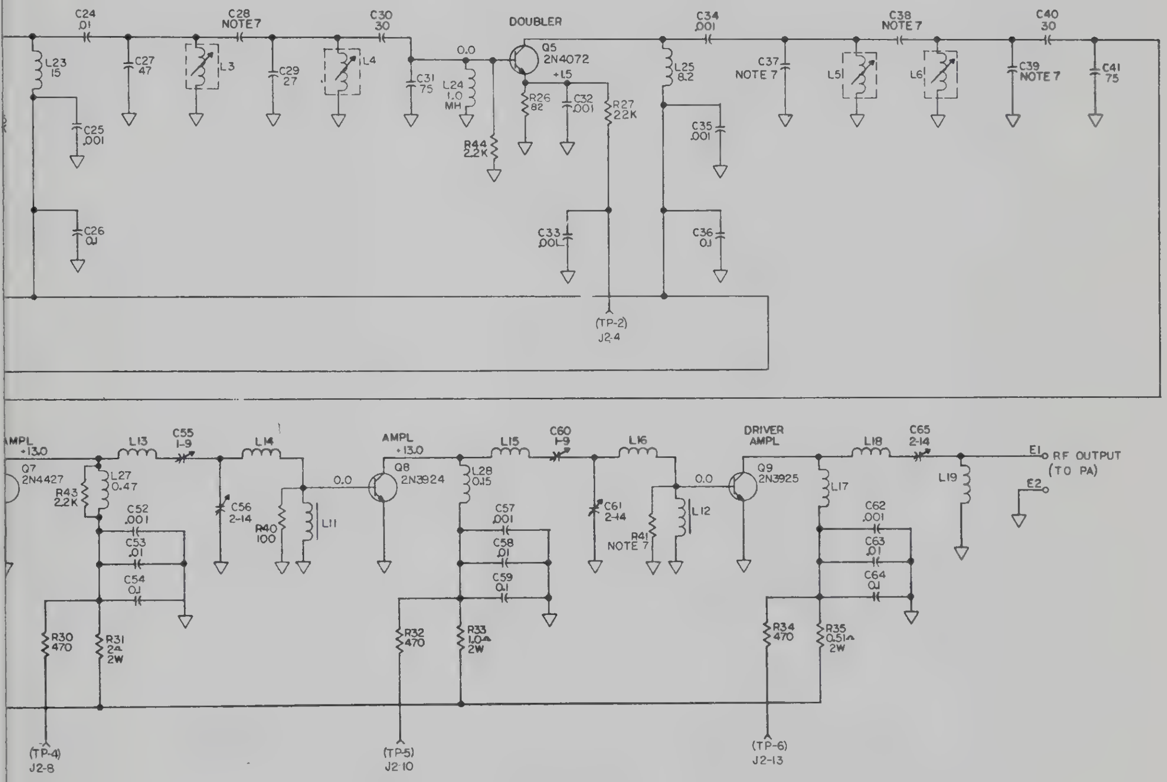


FIGURE 4.13 - EXCITER ASSEMBLY A2
SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RECEIVER ASSEMBLY A1		
C1	Cap, Dis, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C2	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 15 VDCW	C-0065
C3	Cap, Var, 1.7 - 14.1 pf	C-4644
C4	132-148 MHz Cap, Disc, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C5	132-148 MHz Cap, Cer, 1.2 pf, 5%, 500 VDCW	C-4610
	148-174 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4608
C6	132-148 MHz Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C7	Cap, Var, 1.7 - 14.1 pf	C-4644
C8	132-148 MHz Cap, Cer, 5.6 pf, 5%, 500 VDCW	C-4626
	148-174 MHz Cap, Cer, 4.7 pf, 5%, 500 VDCW	C-4624
C9	Cap, Cer, 4.2 pf, 5%, 500 VDCW	C-4617
C10	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C11	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C12	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C13	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C14	Cap, Var, 1.7 - 14.1 pf	C-4644
C15	Cap, Cer, 0.68 pf, 5%, 500 VDCW	C-4604
C16	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
C16 (Cont)	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C17	Cap, Var, 1.7 - 14.1 pf	C-4644
C18	Cap, Cer, 2.7 pf, 5%, 500 VDCW	C-4618
C19	Cap, Elect, 20 uf, +150%, -10%, 50 VDCW	C-1111
C20	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C21	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C22	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C23	Cap, Mica, 1000 pf, 5%, 500 VDCW	C-0152
C24	Not used	
C25	Not used	
C26	Not used	
C27	Cap, Var, 1.7 - 14.1 pf	C-4644
C28	Cap, Cer, 0.68 pf, 5%, 500 VDCW	C-4604
C29	Cap, Var, 1.7 - 14.1 pf	C-4644
C30	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C31	Cap, Var, 5.5 - 18 pf	C-6117
C32	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C33	Cap, Var, 5.5 - 18 pf	C-6117
C34	Cap, Disc, Cer, 0.001 uf, +60%, -40%, 150 VDCW	C-0065
C35	Cap, Mica, 220 pf, 5%, 500 VDCW	C-0134
C36	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C37	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C38	Cap, Mica, 130 pf, 5%, 500 VDCW	C-0129
C39	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C40	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C41	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C42	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C43	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C44	Cap, Disc, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C45	Cap, Disc, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C46	Cap, Mica, 180 pf, 5%, 500 VDCW	C-0132
C47	Cap, Mica, 82 pf, 5%, 500 VDCW	C-0124
C48	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C49	Cap, Disc, Cer, 0.01 uf, +80%, -20%, 25 VDCW	C-2210
C50	Cap, Mica, 2500 pf, 5%, 500 VDCW	C-0162
C51	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C52	Cap, Mica, 1000 pf, 5%, 500 VDCW	C-0152
C53	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C54	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C55	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C56	Cap, Mica, 360 pf, 5%, 500 VDCW	C-0140
C57	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C58	Cap, Mica, 430 pf, 5%, 500 VDCW	C-0142
C59	Cap, Mica, 430 pf, 5%, 500 VDCW	C-0142
C60	Cap, Mica, 180 pf, 5%, 500 VDCW	C-0132
C61	Cap, Mica, 240 pf, 5%, 500 VDCW	C-0135
C62	Cap, Mica, 470 pf, 5%, 500 VDCW	C-0143
C63	Cap, Tant, 1.5 uf, 20%, 50 VDCW	C-6407
C64	Cap, Tant, 0.1 uf, 10%, 35 VDCW	C-6415
C65	Cap, Cer, 0.2 uf, +80%, -20%, 10 VDCW	C-0057
C66	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C67	Cap, Tant, 1.5 uf, 20%, 50 VDCW	C-6407
C68	Cap, Elect., 25 uf, +150%, -10%, 25 VDCW	C-1097
C69	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C70	Cap, Mylar, 0.0033 uf, 10%, 100 VDCW	C-2106
C71	Cap, Mylar, 0.0082 uf, 10%, 100 VDCW	C-2111
C72	Cap, Mylar, 0.047 uf, 20%, 100 VDCW	C-0803
C73	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C74	Cap, Tubular, Mylar, 0.033 uf, 10%, 100 VDCW	C-2118
C75	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C76	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C77	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C78	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C79	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C80	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C81	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C82	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C83	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C84	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C85	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C86	Cap, Mica, 27 pf, 5%, 500 VDCW	C-0111
C87	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C88	Not used	
C89	Not used	
C90	Not used	
C91	Not used	
C92	Not used	
C93	Not used	
C94	Not used	
C95	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C96	Cap, Mica, 330 pf, 5%,	C-0139
C97	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C98	132-148 MHz Cap, Disc, NPO, 22 pf, 5%, 1 KVDCW	C-4746
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C99	Not used	
C100	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C101	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C102	Not used	
C103	Cap, Disc, NPO, 18 pf, 5%, 1 KVDCW	C-4744
C104	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C105	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C106	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C107	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C108	Cap, Tant, 1.0 uf, 20%, 15 VDCW	C-6442
C109	Cap, Tant, 0.15 uf, 10%, 35 VDCW	C-6516
C110	Cap, Tant, 10 uf, 20%, 20 VDCW	C-6448
C111	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C112	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C113	Cap, Tant, 5.6 uf, 10%, 6 VDCW	C-6172
C114	132-148 MHz Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
	148 - 174 MHz Cap, Disc, NPO, 20 pf, 5%, 1 KVDCW	C-4745
C115	Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
CR1	Diode, 1N4454	CR-0705
CR2	Diode, 1N4454	CR-0705
CR3	Not used	
CR4	Diode, 1N4454	CR-0705
CR5	Diode, 1N270	CR-0047
CR6	Diode, 1N270	CR-0047
CR7	Not used	
CR8	Not used	
CR9	Diode, Zener, 1N4733	CR-0664
FL1	Filter, Crystal, Narrow Band	B483-0211
IC1	Integrated Circuit, Type CA-3012	IC-0002
IC2	Integrated Circuit Type CA-3005	IC-0005
L1	Inductor Assembly	483-0226
L2	Inductor Assembly	483-0226
L3	Inductor Assembly	483-0227
L4	Inductor Assembly	483-0226
L5	Inductor Assembly	483-0227
L6	Inductor Assembly	483-0226
L7	Choke, 1.0 mh, 10%	L-0050
L8	Not used	
L9	Not used	
L10	Not used	
L11	Not used	
L12	Not used	
L13	Not used	
L14	Not used	
L15	Not used	
L16	Not used	
L17	Inductor Assembly, Var	483-0230
L18	Choke, 1.0 mh, 10%	L-0050
L19	Inductor Assembly, Var	483-0231
L20	Inductor Assembly, Var	483-0232
L21	Choke, Filter, 100 mh	L-0575
L22	Choke, 1.0 uh, 10%	L-0054
L23	Choke, 1.0 uh, 10%	L-0054
L24	Not used	
L25	Choke, 220 uh, 5%	L-0067
L26	Choke, 1 mh, 10%	L-0050
L27	Inductor Assembly, Var	483-0234
L28	Choke, 10 uh, 10%	L-0057
L29	Inductor Assembly, Var	483-0233
Q1	Transistor, same as 2N5486	Q-0376
Q2	Transistor, same as 2N5486	Q-0376
Q3	Transistor, same as 2N5486	Q-0376
Q4	Not used	
Q5	Not used	
Q6	Transistor, 2N5172	Q-0027
Q7	Transistor, same as 2N5486	Q-0376
Q8	Transistor, 2N3905	Q-0356
Q9	Transistor, MPS706	Q-0017
Q10	Transistor, MPS706	Q-0017
Q11	Transistor, same as 2N5486	Q-0376
Q12	Not used	
Q13	Not used	
Q14	Not used	
Q15	Transistor, 2N5172	Q-0027
Q16	Transistor, 2N5172	Q-0027
Q17	Transistor, 2N5172	Q-0027
Q18	Transistor, 2N5172	Q-0027
Q19	Transistor, 2N5172	Q-0027
Q20	Transistor, MJE-371	Q-0349
Q21	Transistor, 2N5172	Q-0027
Q22	Transistor, 2N5172	Q-0027
Q23	Transistor, MPS6534	Q-0329
Q24	Transistor, MPS6530	Q-0331
Q25	Transistor, MPS6534	Q-0329
Q26	Transistor, 2N4919	Q-0338
Q27	Transistor, 2N4922	Q-0335
R1	Res, comp, 47 ohm, 10%, 1/4W	R-0008
R2	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R3	Not used	
R4	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R5	Not used	
R6	Not used	
R7	Not used	
R8	Res, comp, 1K, 10%, 1/4W	R-0024
R9	Not used	
R10	Res, comp, 68 ohm, 10%, 1/4W	R-0010
R11	Res, comp, 1.2K, 10%, 1/4W	R-0025
R12	Res, comp, 1.2K, 10%, 1/4W	R-0025
R13	Res, comp, 680 ohm, 10%, 1/4W	R-0022
R14	Res, comp, 15K, 10%, 1/4W	R-0038
R15	Res, comp, 10K, 10%, 1/4W	R-0036
R16	Res, comp, 47 ohm, 10%, 1/4W	R-0008
R17	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R18	Res, comp, 3K, 5%, 1/4W	R-1264
R19	Res, comp, 1K, 10%, 1/4W	R-0024
R20	Res, comp, 1K, 10%, 1/4W	R-0024
R21	Res, comp, 22 ohm, 10%, 1/4W	R-0004
R22	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R23	Res, comp, 18K, 10%, 1/4W	R-0039
R24	Res, comp, 18K, 10%, 1/4W	R-0039
R25	Res, comp, 2.2K, 10%, 1/4W	R-0028
R26	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R27	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R28	Res, comp, 18K, 10%, 1/4W	R-0039
R29	Res, comp, 18K, 10%, 1/4W	R-0039
R30	Res, comp, 1.2K, 10%, 1/4W	R-0025
R31	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R32	Res, comp, 10K, 10%, 1/4W	R-0036
R33	Res, comp, 560 ohm, 10%, 1/4W	R-0021
R34	Res, comp, 22K, 10%, 1/4W	R-0028
R35	Res, comp, 10K, 10%, 1/4W	R-0036
R36	Res, comp, 1K, 10%, 1/4W	R-0024
R37	Res, comp, 22K, 10%, 1/4W	R-0040
R38	Res, comp, 22K, 10%, 1/4W	R-0040
R39	Res, comp, 33K, 10%, 1/4W	R-0042
R40	Res, comp, 18K, 10%, 1/4W	R-0039
R41	Res, comp, 3.9K, 10%, 1/4W	R-0031
R42	Res, comp, 3.3K, 10%, 1/4W	R-0030
R43	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R44	Res, comp, 3.9K, 10%, 1/4W	R-0031
R45	Res, comp, 3.9K, 10%, 1/4W	R-0031
R46	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R47	Not used	
R48	Res, comp, 15K, 10%, 1/4W	R-0038
R49	RF-401-2 Res, comp, 1.5K, 10%, 1/4W	R-0026
	RF-404-3 Res, comp, 3.3K, 10%, 1/4W	R-0030
	RF-403-2 Res, comp, 1.5K, 10%, 1/4W	R-0026
R50	Res, comp, 39K, 10%, 1/4W	R-0043
R51	Res, comp, 33 ohm, 10%, 1/4W	R-0006
R52	RF-401-2 Res, comp, 1K, 10%, 1/4W	R-0024
	RF-404-3 Res, comp, 4.7K, 10%, 1/4W	R-0032
	RF-403-2 Res, comp, 1K, 10%, 1/4W	R-0024
R53	Res, W.W., 0.56 ohm, 10%, 2W	R-3845
R54	Res, comp, 27K, 10%, 1/4W	R-0041
R55	Res, comp, 1K, 10%, 1/4W	R-0024
R56	Res, comp, 5.6K, 10%, 1/4W	R-0033
R57	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R58	Res, comp, 2.2K, 10%, 1/4W	R-0028
R59	Res, comp, 10K, 10%, 1/4W	R-0036
R60	Res, comp, 10K, 10%, 1/4W	R-0036
R61	Res, comp, 22K, 10%, 1/4W	R-0040
R62	Res, comp, 3.3K, 10%, 1/4W	R-0030
R63	Res, comp, 8.2K, 10%, 1/4W	R-0035
R64	Res, comp, 4.7K, 10%, 1/4W	R-0032
R65	Res, comp, 150 ohm, 10%, 1/4W	R-0014
R66	Res, comp, 3.9K, 10%, 1/4W	R-0031
R67	Res, comp, 2.7K, 10%, 1/4W	R-0029
R68	Res, Var, 2K	R-3713
R69	Res, comp, 2.7K, 10%, 1/4W	R-0029
R70	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R71	Res, comp, 820 ohm, 10%, 1/4W	R-0223
R72	Res, comp, 3.3K, 10%, 1/4W	R-0030
R73	Res, comp, 1.2K, 10%, 1/4W	R-0025
R74	Res, comp, 3.9K, 10%, 1/4W	R-0031
R75	Res, comp, 39K, 10%, 1/4W	R-0043
R76	Res, comp, 47K, 10%, 1/4W	R-0044
Y1	Crystal, Frequency, 20.455 MHz	Y-0910
	RFI shield (first rf stage)	B483-0235
	RFI shield (second rf stage)	B483-0235
	RFI shield (first mixer stage)	B483-0237

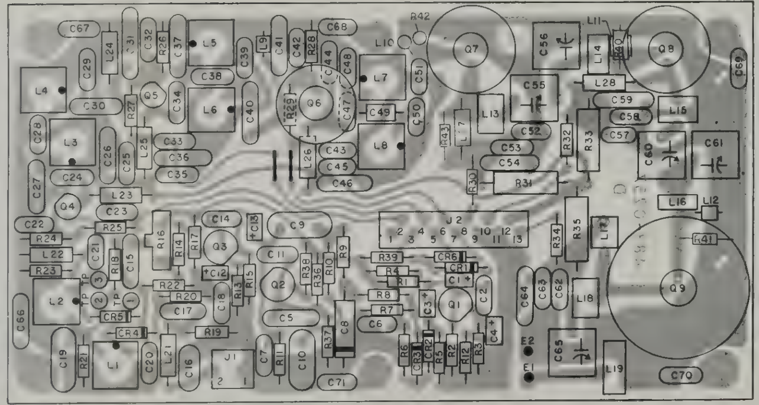
EXCITER BOARD A2, VOLTAGE/RESISTANCE CHART

Stage	Voltage (DC)			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
Q1	+2.4	+1.8	+5.0	700Ω (2) 750Ω (2)	500Ω (2) 500Ω (2)	4.5K (2) 1.5K (2)
Q2	+5.4 (Note 1)	+4.0	+9.0	10K (2) 70K (3)	50K (2) 8K (2)	8K (2) 8K (2)
Q3	-0.9	-0.5	+6.0	3K (2) 18K (3)	1.6K (2) 2K (2)	10K (2) 9K (2)
Q4	0	+2.0	+13.0	14Ω (1) 14Ω (1)	200Ω (2) 200Ω (2)	20M (3) 700Ω (2)
Q5	0	+2.8	+13.0	14Ω (1) 14Ω (1)	90Ω (2) 90Ω (2)	20M (3) 650 (2)
Q6	0	+3.2	13.0	0 (1) 0 (1)	17Ω (1) 100Ω (1)	20M (3) 650Ω (2)
Q7	0	——	+13.0	1Ω (1) 1Ω (1)	0 (1) 0 (1)	20M (3) 700Ω (2)
Q8	0	——	+13.0	0 (1) 0 (1)	0 (1) 0 (1)	20M (3) 700Ω (2)
Q9	0	——	+13.0	0 (1) 0 (1)	0 (1) 0 (1)	20M (3) 700Ω (2)

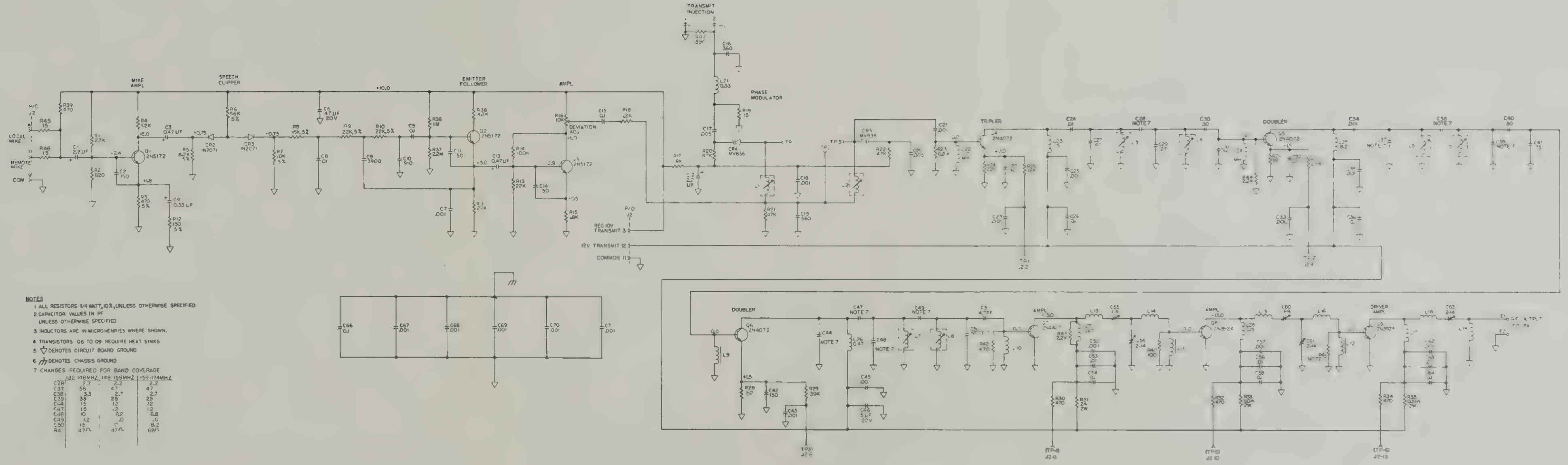
NOTES

1. Use 11-megohm VTVM at this point.
2. Resistance
   (1) R x 1 range
   (2) R x 100 range
   (3) R x 10,000 range
3. Measurements made with Simpson Model 260 VOM under no signal condition.
4. Measurements shown are actual readings and may vary by 15%.
5. Resistance measurements made with board disconnected.

Negative Ground ◸ Positive Ground



EXCITER ASSEMBLY A2, COMPONENT LOCATION



NOTES

1 ALL RESISTORS 1/4 WATT, 10%, UNLESS OTHERWISE SPECIFIED
2 CAPACITOR VALUES IN PF
UNLESS OTHERWISE SPECIFIED
3 INDUCTORS ARE IN MICROHENRIES WHERE SHOWN.
4 TRANSISTORS Q6 TO Q9 REQUIRE HEAT SINKS
5 ▽ DENOTES CIRCUIT BOARD GROUND
6 ⏚ DENOTES CHASSIS GROUND
7 CHANGES REQUIRED FOR BAND COVERAGE

	132-148MHZ	148-159MHZ	159-174MHZ
C28	2.7	2.2	2.2
C37	56	47	47
C38	3.3	2.7	2.7
C39	33	25	25
C44	15	12	12
C47	15	12	12
C48	10	8.2	6.8
C49	1.2	1.0	1.0
C50	15	[illegible]	8.2
R4	47Ω	47Ω	68Ω

FIGURE 4.13 - EXCITER ASSEMBLY A2 SCHEMATIC DIAGRAM

ESCRIPTION	RF PART NUMBER
comp, 7K, 5%, 1/4W	R-0041
comp, 50 ohm, 5%, 1/4W	R-1229
comp, 2K, 10%, 1/4W	R-0040
comp, 00K, 10%, 1/4W	R-0048
comp, .8K, 10%, 1/4W	R-0027
Var., 0K	R-3715
comp, 3K, 10%, 1/4W	R-0039
comp, .2K, 10%, 1/4W	R-0025
comp, 5 ohm, 10%, 1/4W	R-0002
comp, 7K, 10%, 1/4W	R-0044
comp, 7K, 10%, 1/4W	R-0044
comp, 7K, 10%, 1/4W	R-0044
comp, 8K, 10%, 1/4W	R-0034
comp, 20 ohm, 10%, 1/4W	R-0016
comp, 3K, 10%, 1/4W	R-0039
comp, 2 ohm, 10%, 1/4W	R-0011
comp, 2K, 10%, 1/4W	R-0040
comp, 2 ohm, 10%, 1/4W	R-0011
comp, 0K, 10%, 1/4W	R-0043
comp, 70 ohm, 10%, 1/4W	R-0020
W.W., ohm, 2W	R-3914
comp, 0 ohm, 10%, 1/4W	R-0020
W.W., ohm, 2W	R-3907
comp, 0 ohm, 10%, 1/4W	R-0020
W.W., 51 ohm, 2W	R-3900
comp, meg, 10%, 1/4W	R-0060
comp, 2 meg, 10%, 1/4W	R-0064
comp, 7K, 10%, 1/4W	R-0032
comp, 0 ohm, 10%, 1/4W	R-0020
comp, 0 ohm, 10%, 1/4W .58 MHz	R-0012
comp, ohm, 10%, 1/4W 74 MHz	R-0008
comp, ohm, 10%, 1/4W	R-0010
comp, 0 ohm, 10%, 1/4W	R-0020

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
	EXCITER ASSEMBLY A2				
R43	Res, comp, 2.2K, 10%, 1/4W	R-0028			
R44	Res, comp, 2.2K, 10%, 1/4W	R-0028			
R45	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002			
R46	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002			
R47	Res, comp, 390 ohm, 10%, 1/4W	R-0019			
	Heat sink for Q6	X-1007			
	Heat sink for Q7	X-1008			
	Heat sink for Q8	X-1008			
	Heat sink for Q9	B484-0192			

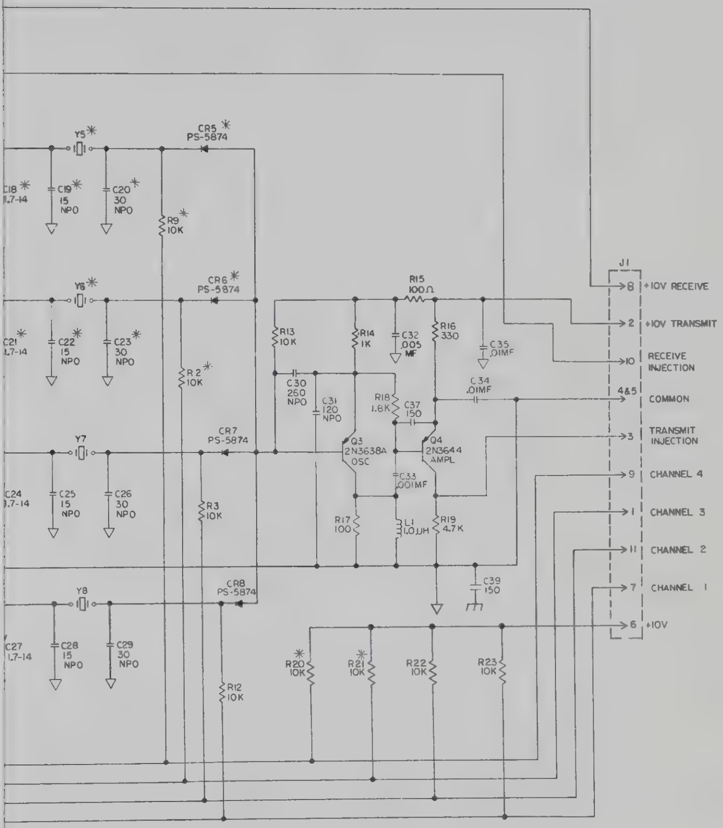


FIGURE 4. 14 - OSCILLATOR ASSEMBLY A3
SCHEMATIC DIAGRAM

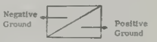
REF DESIG	DESCRIPTION	RF PART NUMBER
EXCITER ASSEMBLY A2		
C1	Cap, Tant, 2.2 uf, 20%, 20 VDCW	C-6444
C2	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C3	Cap, Tant, 0.47 uf, 20%, 35 VDCW	C-6419
C4	Cap, Tant, 0.33 uf, 10%, 35 VDCW	C-6518
C5	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C6	Cap, Tant, 47 uf, 20%, 20 VDCW	C-6452
C7	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C8	Cap, Tubular, Mylar, 0.01 uf, 10%, 100 VDCW	C-2112
C9	Cap, DM, 3900 pf, 5%, 500 VDCW	C-0167
C10	Cap, DM, 910 pf, 5%, 500 VDCW	C-0151
C11	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C12	Cap, Tant, 2.2 uf, 20%, 20 VDCW	C-6444
C13	Cap, Tant, 0.47 uf, 20%, 35 VDCW	C-6419
C14	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C15	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C16	Cap, DM, 360 pf, 5%, 500 VDCW	C-0140
C17	Cap, Disc, Cer, 0.005 uf, +60%, -40%, 150 VDCW	C-0064
C18	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C19	Cap, DM, 560 pf, 5%, 500 VDCW	C-0146
C20	Cap, Disc, Cer, 0.005 uf, +60%, -40%, 150 VDCW	C-0064
C21	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C22	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C23	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C24	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C25	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C26	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C27	Cap, Disc, NPO, 47 pf, 5%, 1 KVDCW	C-4752
C28	132-148 MHz Cap, Disc, NPO, 2.7 pf, ±0.5 pf, 1 KVDCW	C-4732
	148-174 MHz Cap, Disc, NPO, 2.2 pf, ±0.5 pf, 1 KVDCW	C-4731
C29	Cap, Disc, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C30	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C31	Cap, Disc, NPO, 75 pf, 5%, 1 KVDCW	C-4756
C32	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C33	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C34	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C35	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C36	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C37	132-148 MHz Cap, Disc, NPO, 56 pf, 5%, 1 KVDCW	C-4754
	148-174 MHz Cap, Disc, NPO, 47 pf, 5%, 1 KVDCW	C-4752
C38	132-148 MHz Cap, Disc, NPO, 3.3 pf, ±0.5 pf, 1 KVDCW	C-4734
	148-174 MHz Cap, Disc, NPO, 2.7 pf, ±0.5 pf, 1 KVDCW	C-4732
C39	132-148 MHz Cap, Disc, NPO, 33 pf, 5%, 1 KVDCW	C-4750
C39 (Cont)	148-174 MHz Cap, Disc, NPO, 25 pf, 5%, 1 KVDCW	C-4747
C40	Cap, Disc, NPO, 30 pf, 5%, 1 KVDCW	C-4749
C41	Cap, Disc, NPO, 75 pf, 5%, 1 KVDCW	C-4756
C42	Cap, Disc, 150 pf, 20%, 1 KVDCW	C-4794
C43	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C44	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C45	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C46	Cap, Tant, 15 uf, 20%, 20 VDCW	C-6449
C47	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	148-174 MHz Cap, Disc, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C48	132-148 MHz Cap, Disc, NPO, 10 pf, 5%, 1 KVDCW	C-4741
	148-158 MHz Cap, Disc, NPO, 8.2 pf, ±0.5 pf, 1 KVDCW	C-4740
	158-174 MHz Cap, Disc, NPO, 6.8 pf, ±0.5 pf, 1 KVDCW	C-4739
C49	132-148 MHz Cap, Cer, 1.2 pf, 5%, 500 VDCW	C-4610
	148-174 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4608
C50	132-148 MHz Cap, Disc, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	148-158 MHz Cap, Disc, NPO, 10 pf, 5%, 1 KVDCW	C-4741
C50 (Cont)	158-174 MHz Cap, Disc, NPO, 8.2 pf, ±0.5%, 1 KVDCW	C-4740
C51	Cap, Disc, Cer, NPO, 4.7 pf, 5%, 1 KVDCW	C-4736
C52	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C53	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C54	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C55	Cap, Air Var., 1.4-9.2 pf	C-4642
C56	Cap, Air Var., 1.7-14.1 pf	C-4644
C57	Cap, Disc, Cer, 0.001 uf, GMV 500 VDCW	C-0001
C58	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C59	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C60	Cap, Air Var., 1.4-9.2 pf	C-4642
C61	Cap, Air Var., 1.7-14.1 pf	C-4644
C62	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C63	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C64	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C65	Cap, Air Var., 1.7-14.1 pf	C-4644
C66	Cap, Disc, Cer, 0.1 uf, +80%, -20%, 25 VDCW	C-2210
C67	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C68	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C69	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C70	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
C71	Cap, Disc, Cer, 0.001 uf, GMV, 500 VDCW	C-0001
CR1	RF-401-2, RF-404-3 only Diode, 1N2071	CR-0001
CR2	Diode, 1N2071	CR-0001
CR3	Diode, 1N2071	CR-0001
CR4	Diode, VVC, MV836	CR-0667
CR5	Diode, VVC, MV836	CR-0667
CR6	RF-401-2, RF-404-3 only Diode, 1N2071	CR-0001
L1	Coil Assembly, Var	483-0260
L2	Coil Assembly, Var	483-0260
L3	Coil Assembly, Var	483-0261
L4	Coil Assembly, Var	483-0261
L5	Coil Assembly, Var	483-0262
L6	Coil Assembly, Var	483-0262
L7	Coil Assembly, Var	483-0263
L8	Coil Assembly, Var	483-0263
L9	Coil Assembly	483-0269
L10	Coil, 100 uh	L-0051
L11	Coil Assembly	483-0269
L12	Coil Assembly	483-0269
L13	Coil Assembly	483-0265
L14	132-148 MHz Coil Assembly	483-0266
	148-174 MHz Coil Assembly	483-0264
L15	Coil Assembly	483-0266
L16	Coil Assembly	483-0264
L17	Coil Assembly	483-0267
L18	132-148 MHz Coil Assembly	483-0275
	148-174 MHz Coil Assembly	483-0265
L19	Coil Assembly	483-0268
L20	Not used	
L21	Coil, 0.33 uh	L-0035
L22	Coil, 1.0 mh	L-0050
L23	Coil, 15 uh	L-0084
L24	Coil, 1.0 mh	L-0050
L25	Coil, 8.2 uh	L-0082
L26	Coil, 0.47 uh	L-0028
L27	Coil, 0.47 uh	L-0028
L28	Coil, 0.15 uh	L-0074
Q1	Transistor, 2N5172	Q-0027
Q2	Transistor, 2N5172	Q-0027
Q3	Transistor, 2N5172	Q-0027
Q4	Transistor, 2N4072	Q-0033
Q5	Transistor, 2N4072	Q-0033
Q6	Transistor, 2N4072	Q-0033
Q7	Transistor, 2N4427	Q-0343
Q8	Transistor, 2N3924	Q-0345
Q9	Transistor, 2N3925	Q-0031
R1	Res, Comp, 2.7K, 10%, 1/4W	R-0029
R2	Res, comp, 820 ohm, 10%, 1/4W	R-0023
R3	Res, comp, 470 ohm, 5%, 1/4W	R-1241
R4	Res, comp, 8.2K, 5%, 1/4W	R-1271
R5	Res, comp, 8.2K, 5%, 1/4W	R-1271
R6	Res, comp, 56K, 5%, 1/4W	R-1291
R7	Res, comp, 10K, 5%, 1/4W	R-1273
R8	Res, comp, 15K, 5%, 1/4W	R-1277
R9	Res, comp, 22K, 5%, 1/4W	R-1281
R10	Res, comp, 22K, 5%, 1/4W	R-1281
R11	Res, comp, 27K, 5%, 1/4W	R-0041
R12	Res, comp, 150 ohm, 5%, 1/4W	R-1229
R13	Res, comp, 22K, 10%, 1/4W	R-0040
R14	Res, comp, 100K, 10%, 1/4W	R-0048
R15	Res, comp, 1.8K, 10%, 1/4W	R-0027
R16	Res, Var., 10K	R-3715
R17	Res, comp, 18K, 10%, 1/4W	R-0039
R18	Res, comp, 1.2K, 10%, 1/4W	R-0025
R19	Res, comp, 15 ohm, 10%, 1/4W	R-0002
R20	Res, comp, 47K, 10%, 1/4W	R-0044
R21	Res, comp, 47K, 10%, 1/4W	R-0044
R22	Res, comp, 47K, 10%, 1/4W	R-0044
R23	Res, comp, 6.8K, 10%, 1/4W	R-0034
R24	Res, comp, 220 ohm, 10%, 1/4W	R-0016
R25	Res, comp, 18K, 10%, 1/4W	R-0039
R26	Res, comp, 82 ohm, 10%, 1/4W	R-0011
R27	Res, comp, 22K, 10%, 1/4W	R-0040
R28	Res, comp, 82 ohm, 10%, 1/4W	R-0011
R29	Res, comp, 39K, 10%, 1/4W	R-0043
R30	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R31	Res, W.W., 2 ohm, 2W	R-3914
R32	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R33	Res, W.W., 1 ohm, 2W	R-3907
R34	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R35	Res, W.W., 0.51 ohm, 2W	R-3900
R36	Res, comp, 1 meg, 10%, 1/4W	R-0060
R37	Res, comp, 2.2 meg, 10%, 1/4W	R-0064
R38	Res, comp, 4.7K, 10%, 1/4W	R-0032
R39	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R40	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R41	132-158 MHz Res, comp, 47 ohm, 10%, 1/4W	R-0008
	158-174 MHz Res, comp, 68 ohm, 10%, 1/4W	R-0010
R42	Res, comp, 470 ohm, 10%, 1/4W	R-0020
R43	Res, comp, 2.2K, 10%, 1/4W	R-0028
R44	Res, comp, 2.2K, 10%, 1/4W	R-0028
R45	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002
R46	RF-403-2 only Res, comp, 15 ohm, 10%, 1/4W	R-0002
R47	Res, comp, 390 ohm, 10%, 1/4W	R-0019
	Heat sink for Q6	X-1007
	Heat sink for Q7	X-1008
	Heat sink for Q8	X-1008
	Heat sink for Q9	B484-0192

OSCILLATOR BOARD A3, VOLTAGE RESISTANCE CHART

Stage	Voltage (DC)			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
Q1	-6.0	-6.8	0	∞(3) 1K (2)	∞(3) 2.6K (2)	0 (1) 0 (1)
Q2	+6.8	+7.3	0	∞(3) 3K (2)	∞(3) 3K (2)	5K (2) 5K (2)
Q3	-6.2	-6.8	0	∞ (2) 1.1K (2)	∞(3) 3K (2)	1Ω (1) 1Ω (1)
Q4	-6.8	+7.2	0	∞(3) 5K (2)	∞(3) 3.5K (2)	5K (2) 5K (2)

NOTES:

1. Resistance

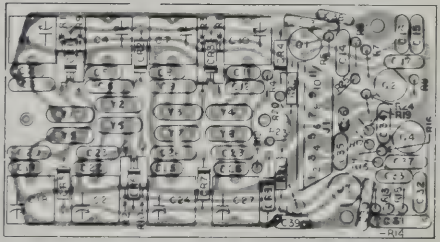


(1) R x 1 range
(2) R x 100 range
(3) R x 10,000 range

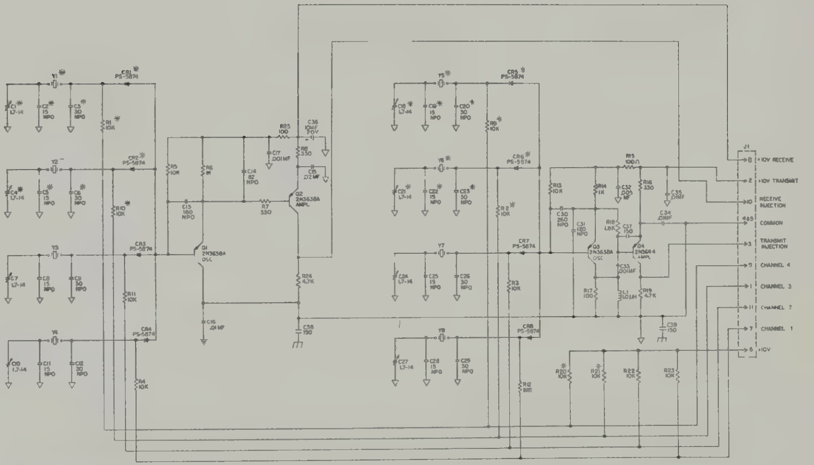
2. Measurements made with Simpson Model 260 VOM, under no signal condition.

3. Measurements shown are actual readings and may vary by 15%.

4. Resistance measurements made with board disconnected.



OSCILLATOR ASSEMBLY A3
COMPONENT LOCATION

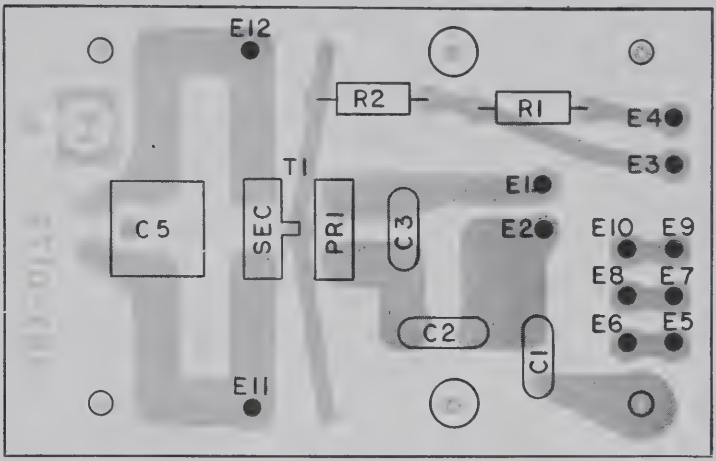


NOTES
1 ALL RESISTORS 1/4W, 10% UNLESS OTHERWISE SPECIFIED
2 ALL CAPACITORS IN PICO FARADS UNLESS OTHERWISE SPECIFIED
3 CONNECTIONS TO "COMMON" ARE SHOWN ⏚
4 CONNECTIONS TO "CHASSIS" ARE SHOWN ⏚
5 ASTERISK(*) INDICATES COMPONENTS NOT USED IN TWO CHANNEL SETS.

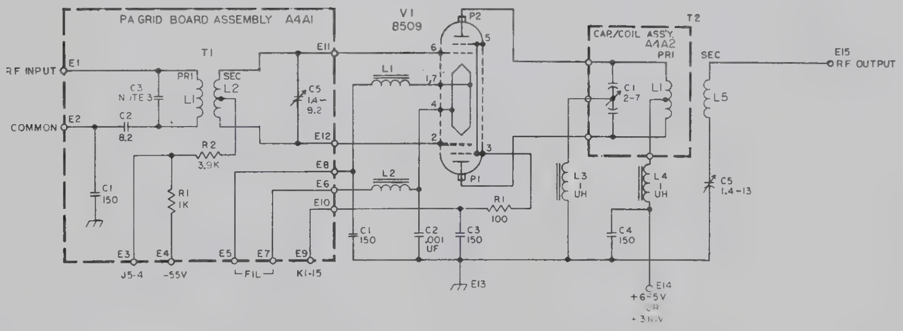
FIGURE 4.14 - OSCILLATOR ASSEMBLY A3
SCHEMATIC DIAGRAM

ESCRIPTION	RF PART NUMBER
nel oscillator only Disc,), 15 pf, 5%, VDCW	C-4743
nel oscillator only Disc,), 30 pf, 5%, VDCW	C-4855
Var, -14 pf	C-4644
Disc,), 15 pf, 5%, VDCW	C-4743
Disc,), 30 pf, 5%, VDCW	C-4855
ar, -14 pf	C-4644
isc,), 15 pf, 5%, VDCW	C-4743
isc,), 30 pf, 5%, VDCW	C-4855
isc,), 260 pf, 5%, VDCW	C-4586
isc,), 120 pf, 5%, VDCW	C-4234
er, 5 uf, +80%, -20%, VDCW	C-2220
isc, 1 uf, GMV, VDCW	C-0001
er, uf, +60%, -40%, VDCW	C-0065
er, uf, +60%, -40%, VDCW	C-0065
ant, f, 20%, DCW	C-6448
er, pf, 20%, VDCW	C-4794
er, pf, 20%, VDCW	C-4794
er, pf, 20%, VDCW	C-4794
nel oscillator only PS-5874	CR-0662
el oscillator only PS-5874	CR-0662
PS-5874	CR-0662
PS-5874	CR-0662
el oscillator only PS-5874	CR-0662
el oscillator only PS-5874	CR-0662
PS-5874	CR-0662
PS-5874	CR-0662
, 1.0 uh	L-0054

REF DESIG	DESCRIPTION	RF PART NUMBER
	OSCILLATOR ASSEMBLY A3	
Q1	Transistor, 2N3638A	Q-0319
Q2	Transistor, 2N3644	Q-0315
Q3	Transistor, 2N3638A	Q-0319
Q4	Transistor, 2N3644	Q-0315
R1	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R2	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R3	Res, comp, 4.7K, 10%, 1/4W	R-0032
R4	Res, comp, 4.7K, 10%, 1/4W	R-0032
R5	Res, comp, 4.7K, 10%, 1/4W	R-0032
R6	Res, comp, 1K, 10%, 1/4W	R-0024
R7	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R8	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R9	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R10	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R11	Res, comp, 4.7K, 10%, 1/4W	R-0032
R12	Res, comp, 4.7K, 10%, 1/4W	R-0032
R13	Res, comp, 4.7K, 10%, 1/4W	R-0032
R14	Res, comp, 1K, 10%, 1/4W	R-0024
R15	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R16	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R17	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R18	Res, 1.8K, 10%, 1/4W	R-0027
R19	Res, 4.7K, 10%, 1/4W	R-0032
R20	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036
R21	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036
R22	Res, 10K, 10%, 1/4W	R-0036
R23	Res, 10K, 10%, 1/4W	R-0036
R24	Res, 4.7K, 10%, 1/4W	R-0032
R25	Res, comp, 100 ohm, 10%, 1/4W	R-0012
Y1	4-channel oscillator only Crystal, Receive, (specify frequency)	Y-0911
Y2	4-channel oscillator only Crystal, Receive (specify frequency)	Y-0911
Y3	Crystal, Receive (specify frequency)	Y-0911
Y4	Crystal, Receive (specify frequency)	Y-0911
Y5	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
Y6	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
Y7	Crystal, Transmit (specify frequency)	Y-0912
Y8	Crystal, Transmit (specify frequency)	Y-0912
	Crystal clamp	B483-0306
	Crystal clamp gasket	B483-0307



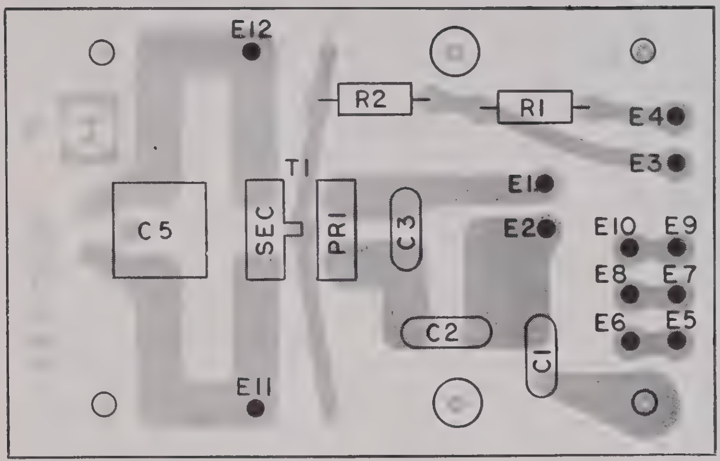
PA GRID BOARD ASSEMBLY
A4A1 COMPONENT LOCATION



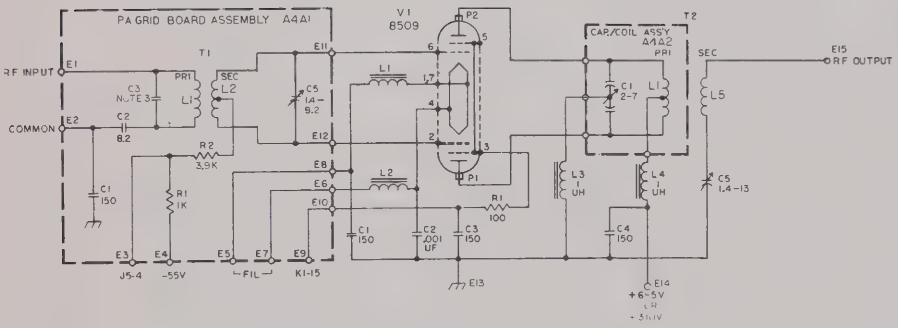
NOTES:
1 UNLESS SPECIFIED OTHERWISE, ALL RESISTORS ARE IN OHMS, 1/2 WATT, 10 % TOL., ALL CAPACITORS ARE IN PICOFARAD.
2 ⏚ DENOTES CHASSIS GROUND
3 C3 IS 12 PF FOR 132-148 MHZ AND 8.2PF FOR 148-174 MHZ

FIGURE 4. 15 - PA ASSEMBLY A4 SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
OSCILLATOR ASSEMBLY A3		
C1	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C2	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C3	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C4	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C5	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C6	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C7	Cap, Var, 1.7-14 pf	C-4644
C8	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C9	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C10	Cap, Var, 1.7-14 pf	C-4644
C11	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C12	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C13	Cap, Disc, NPO, 180 pf, 5%, 200 VDCW	C-4582
C14	Cap, Disc, NPO, 82 pf, 5%, 200 VDCW	C-6228
C15	Cap, Cer, 0.02 uf, +60%, -40%, 150 VDCW	C-0066
C16	Cap, Disc, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C17	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C18	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C19	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C20	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C21	4-channel oscillator only Cap, Var, 1.7-14 pf	C-4644
C22	4-channel oscillator only Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C23	4-channel oscillator only Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C24	Cap, Var, 1.7-14 pf	C-4644
C25	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C26	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C27	Cap, Var, 1.7-14 pf	C-4644
C28	Cap, Disc, NPO, 15 pf, 5%, 200 VDCW	C-4743
C29	Cap, Disc, NPO, 30 pf, 5%, 200 VDCW	C-4855
C3	Cap, Disc, NPO, 260 pf, 5%, 200 VDCW	C-4586
C31	Cap, Disc, NPO, 120 pf, 5%, 200 VDCW	C-4234
C32	Cap, Cer, 0.005 uf, +80%, -20%, 100 VDCW	C-2220
C33	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C34	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C35	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
C36	Cap, Tant, 10 µf, 20%, 20 VDCW	C-6448
C37	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C38	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C39	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
CR1	4-channel oscillator only Diode, PS-5874	CR-0662
CR2	4-channel oscillator only Diode, PS-5874	CR-0662
CR3	Diode, PS-5874	CR-0662
CR4	Diode, PS-5874	CR-0662
CR5	4-channel oscillator only Diode, PS-5874	CR-0662
CR6	4-channel oscillator only Diode, PS-5874	CR-0662
CR7	Diode, PS-5874	CR-0662
CR8	Diode, PS-5874	CR-0662
L1	Inductor, 1.0 uh	L-00[illegible]4
OSCILLATOR ASSEMBLY A3		
Q1	Transistor, 2N3638A	Q-0319
Q2	Transistor, 2N3644	Q-0315
Q3	Transistor, 2N3638A	Q-0319
Q4	Transistor, 2N3644	Q-0315
R1	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R2	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R3	Res, comp, 4.7K, 10%, 1/4W	R-0032
R4	Res, comp, 4.7K, 10%, 1/4W	R-0032
R5	Res, comp, 4.7K, 10%, 1/4W	R-0032
R6	Res, comp, 1K, 10%, 1/4W	R-0024
R7	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R8	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R9	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R10	4-channel oscillator only Res, comp, 4.7K, 10%, 1/4W	R-0032
R11	Res, comp, 4.7K, 10%, 1/4W	R-0032
R12	Res, comp, 4.7K, 10%, 1/4W	R-0032
R13	Res, comp, 4.7K, 10%, 1/4W	R-0032
R14	Res, comp, 1K, 10%, 1/4W	R-0024
R15	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R16	Res, comp, 330 ohm, 10%, 1/4W	R-0018
R17	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R18	Res, 1.8K, 10%, 1/4W	R-0027
R19	Res, 4.7K, 10%, 1/4W	R-0032
R20	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036
R21	4-channel oscillator only Res, comp, 10K, 10%, 1/4W	R-0036
R22	Res, 10K, 10%, 1/4W	R-0036
R23	Res, 10K, 10%, 1/4W	R-0036
R24	Res, 4.7K, 10%, 1/4W	R-0032
R25	Res, comp, 100 ohm, 10%, 1/4W	R-0012
Y1	4-channel oscillator only Crystal, Receive, (specify frequency)	Y-0911
Y2	4-channel oscillator only Crystal, Receive (specify frequency)	Y-0911
Y3	Crystal, Receive (specify frequency)	Y-0911
Y4	Crystal, Receive (specify frequency)	Y-0911
Y5	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
Y6	4-channel oscillator only Crystal, Transmit (specify frequency)	Y-0912
Y7	Crystal, Transmit (specify frequency)	Y-0912
Y8	Crystal, Transmit (specify frequency)	Y-0912
	Crystal clamp	B483-0306
	Crystal clamp gasket	B483-0307



PA GRID BOARD ASSEMBLY
A4A1 COMPONENT LOCATION

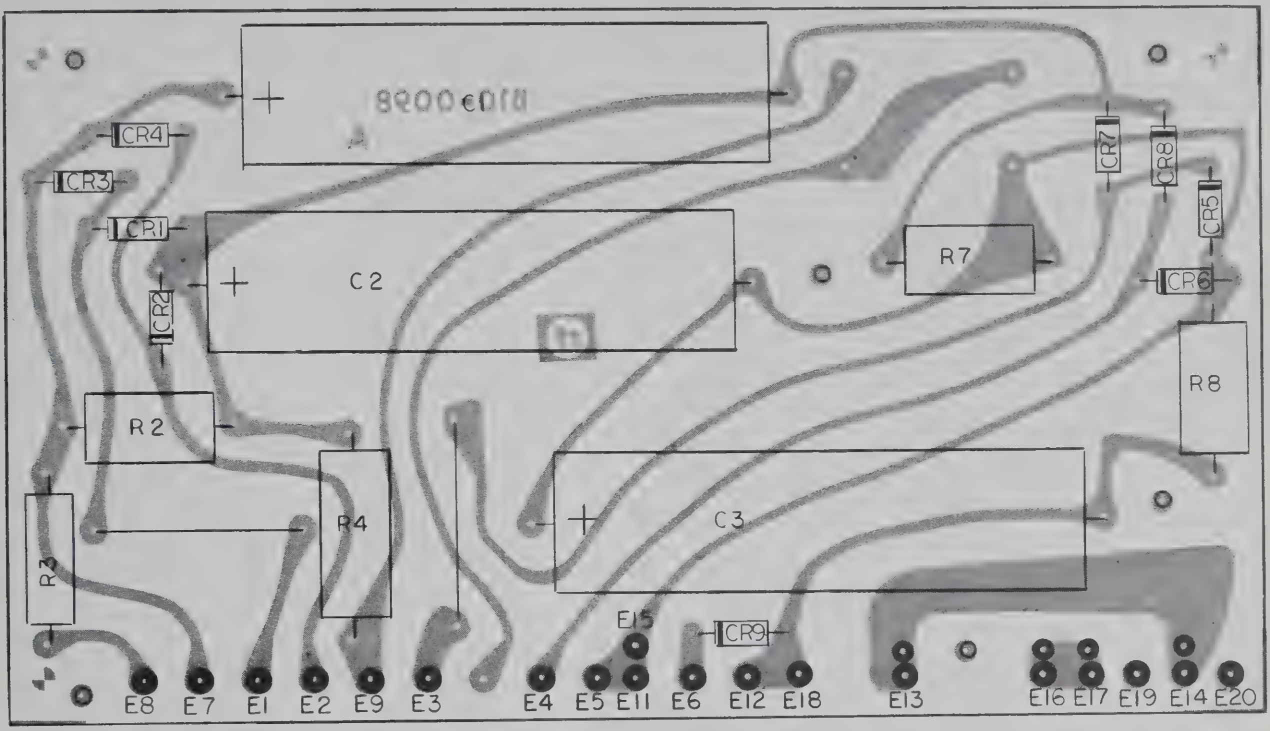


NOTES:
1 UNLESS SPECIFIED OTHERWISE, ALL RESISTORS ARE IN OHMS, 1/2 WATT, 10%.TOL., ALL CAPACITORS ARE IN PICOFARAD.
2 ⏚ DENOTES CHASSIS GROUND
3 C3 IS 12 PF FOR 132-148 MHZ AND 8.2PF FOR 148-174 MHZ

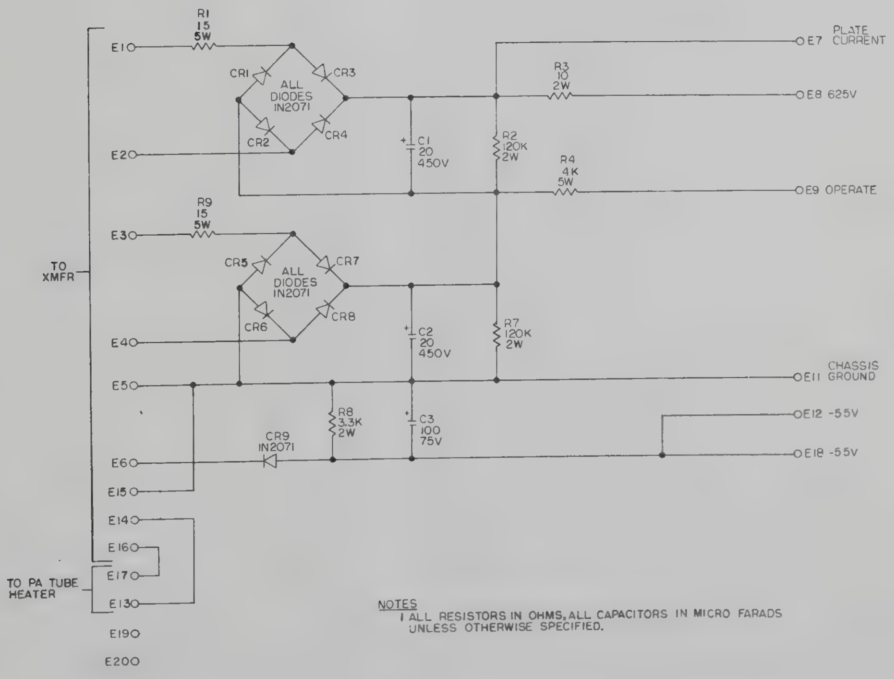
FIGURE 4. 15 - PA ASSEMBLY A4 SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
POWER AMPLIFIER ASSEMBLY A4		
A1	PA Grid Board Assembly, see separate parts list	483-0175
A2	Capacitor/Coil Assembly,	
	132-142 MHz	483-0142
	142-148 MHz	
	148-159 MHz	483-0158
	159-174 MHz	483-0174
C1	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C2	Cap, Disc, Cer, 0.001 uf, 20%, 1 KVDCW	C-4815
C3	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C4	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C5	132-148 MHz	
	Cap, Air Var, 2-27 pf	C-4651
	148-174 MHz	
	Cap, Air Var, 1.4-13 pf	C-4649
L1	Coil Assembly	483-0269
L2	Coil Assembly	483-0269
L3	Choke, 1 uh	L-0054
L4	Choke, 1 uh	L-0054
L5	Coil Assembly	483-0162
R1	Res, comp, 100 ohm, 10%, 1/2W	R-0112
V1	Tube, Vacuum, 8509	V-0112
XV1	Tube, Socket	X-1004
	Plate strap assembly with heat sink	483-0166
	Plate strap assembly with heat sink	483-0166
	Heat sink, tube	B483-0187
	Heat sink, liner	B483-0188

REF DESIG	DESCRIPTION	RF PART NUMBER
PA GRID BOARD ASSEMBLY A4A1		
C1	Cap, Disc, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C2	Cap, Disc, Cer, 8.2 pf, 20%, 1 KVDCW	C-4740
C3	132-148 MHz	
	Cap, Disc, Cer, 12 pf, 5%, 1 KVDCW	C-4742
	148-174 MHz	
	Cap, Disc, Cer, 8.2 pf, 20%, 1 KVDCW	C-4740
C4	Not used	
C5	Cap, Air Var, 1.4-9.2 pf	C-4642
L1	Coil Assembly	
	132-148 MHz	483-0276
	148-174 MHz	483-0182
L2	Coil Assembly	
	132-148 MHz	483-0277
	148-174 MHz	483-0183
R1	Res, comp, 1K, 10%, 1/2W	R-0124
R2	Res, comp, 3.9K, 10%, 1/2W	R-0131



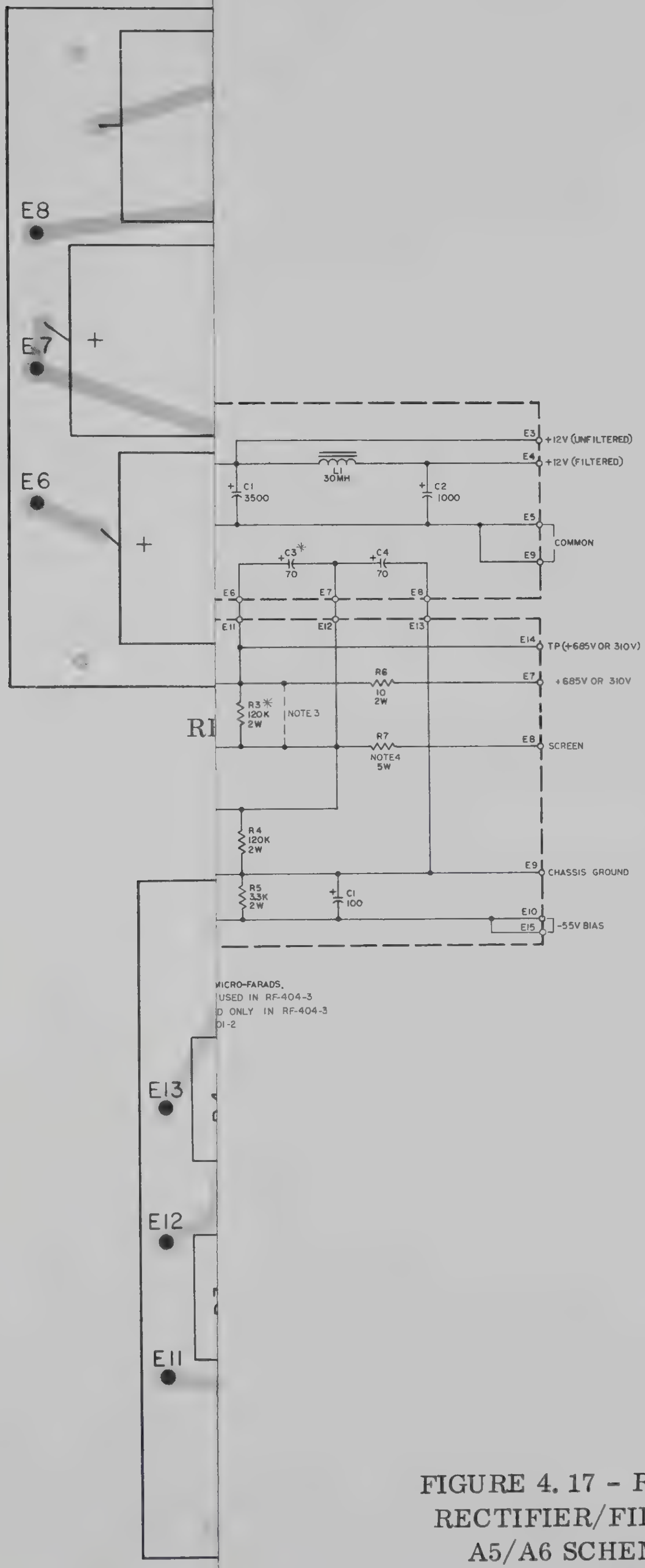
RECTIFIER/FILTER ASSEMBLY
A5 COMPONENT LOCATION



NOTES
1 ALL RESISTORS IN OHMS, ALL CAPACITORS IN MICRO FARADS UNLESS OTHERWISE SPECIFIED.

FIGURE 4. 16 - RF-403-2 RECTIFIER/FILTER ASSEMBLY A5 SCHEMATIC DIAGRAM

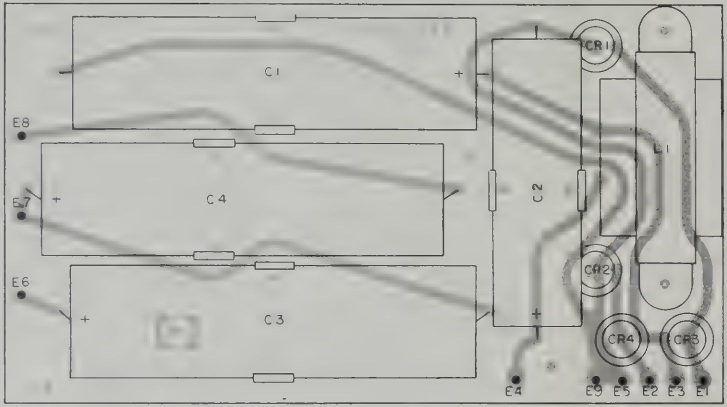
REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER/FILTER ASSEMBLY A5					
C1	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C2	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C3	Cap, Alum, Elec, 100 uf, +50%, -10%, 75 VDCW	C-4668			
CR1	Diode, 1N2071	CR-0001			
CR2	Diode, 1N2071	CR-0001			
CR3	Diode, 1N2071	CR-0001			
CR4	Diode, 1N2071	CR-0001			
CR5	Diode, 1N2071	CR-0001			
CR6	Diode, 1N2071	CR-0001			
CR7	Diode, 1N2071	CR-0001			
CR8	Diode, 1N2071	CR-0001			
CR9	Diode, 1N2071	CR-0001			
R1	Res, W.W., 15 ohm, 10%, 5W	R-3808			
R2	Res, comp, 120K, 10%, 2W	R-0349			
R3	Res, comp, 10 ohm, 5%, 2W	R-1801			
R4	Res, W.W., 4.0K, 10%, 5W	R-3837			
R5	Not used				
R6	Not used				
R7	Res, comp, 120K, 10%, 2W	R-0349			
R8	Res, comp, 3.3K, 10%, 2W	R-0330			



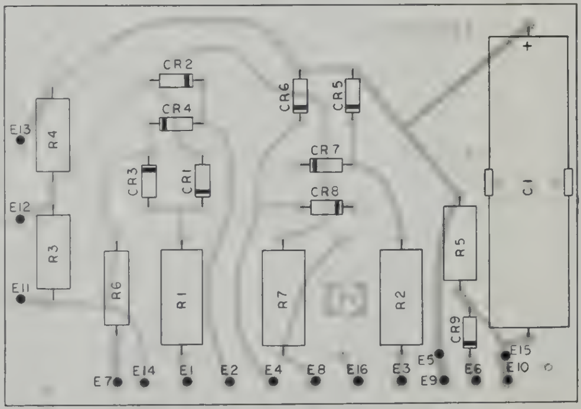
MICRO-FARADS.
USED IN RF-404-3
D ONLY IN RF-404-3
01-2

FIGURE 4.17 - RF-401-2, RF-404-3
RECTIFIER/FILTER ASSEMBLIES
A5/A6 SCHEMATIC DIAGRAM

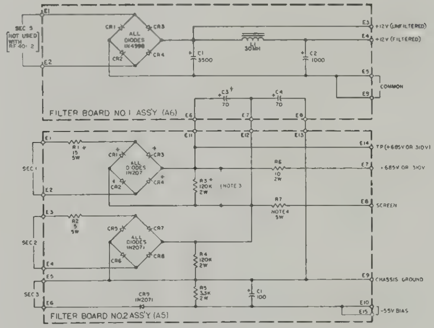
REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER/FILTER ASSEMBLY A5					
C1	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C2	Cap, Alum, Elec, 20 uf, +50%, -10%, 450 VDCW	C-4680			
C3	Cap, Alum, Elec, 100 uf, +50%, -10%, 75 VDCW	C-4668			
CR1	Diode, 1N2071	CR-0001			
CR2	Diode, 1N2071	CR-0001			
CR3	Diode, 1N2071	CR-0001			
CR4	Diode, 1N2071	CR-0001			
CR5	Diode, 1N2071	CR-0001			
CR6	Diode, 1N2071	CR-0001			
CR7	Diode, 1N2071	CR-0001			
CR8	Diode, 1N2071	CR-0001			
CR9	Diode, 1N2071	CR-0001			
R1	Res, W.W., 15 ohm, 10%, 5W	R-3808			
R2	Res, comp, 120K, 10%, 2W	R-0349			
R3	Res, comp, 10 ohm, 5%, 2W	R-1801			
R4	Res, W.W., 4.0K, 10%, 5W	R-3837			
R5	Not used				
R6	Not used				
R7	Res, comp, 120K, 10%, 2W	R-0349			
R8	Res, comp, 3.3K, 10%, 2W	R-0330			



RECTIFIER/FILTER ASSEMBLY A6, COMPONENT LOCATION



RECTIFIER/FILTER ASSEMBLY
A5 COMPONENT LOCATION

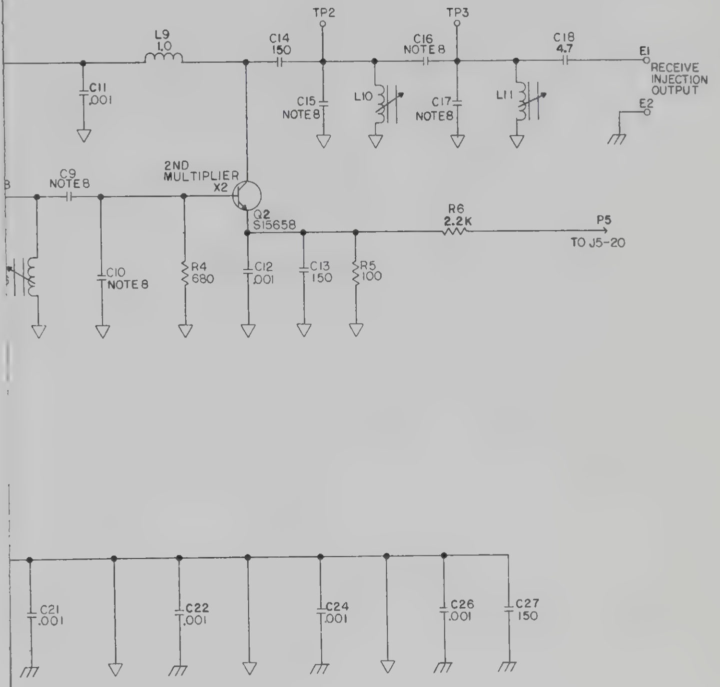


NOTE:
1 ALL RESISTORS IN OHMS, ALL CAPACITOR IN MICRO-FARADS.
2 ASTERISKS (*) INDICATE COMPONENTS NOT USED IN RF-404-3
3 THE DOTTED LINE INDICATES A JUMPER USED ONLY IN RF 404-3
4 R7 IS 4.5K IN RF 404 3 AND 4.0K IN RF 401-2

FIGURE 4.17 - RF-401-2, RF-404-3
RECTIFIER/FILTER ASSEMBLIES
A5/A6 SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER/FILTER ASSEMBLY A5		
C1	Cap, Alum, Elect, 100 uf, +50%, -10%, 75 VDCW	C-4668
CR1	RF-401-2 only Diode, 1N2071	CR-0001
CR2	RF-401-2 only Diode, 1N2071	CR-0001
CR3	RF-401-2 only Diode, 1N2071	CR-0001
CR4	RF-401-2 only Diode, 1N2071	CR-0001
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
CR8	Diode, 1N2071	CR-0001
CR9	Diode, 1N2071	CR-0001
R1	RF-401-2 only Res, W.W., 15 ohm, 10%, 5W	R-3808
R2	Res, W.W., 15 ohm, 10%, 5W	R-3808
R3	RF-401-2 only Res, comp, 120K, 10%, 2W	R-0349
R4	Res, comp, 120K, 10%, 2W	R-0349
R5	Res, comp, 3.3K, 10%, 2W	R-0330
R6	Res, comp, 10 ohm, 5%, 2W	R-1801
R7	RF-401-2 Res, W.W., 4.0K, 10%, 5W RF-404-3 Res, W.W., 4.5K, 10%, 5W	R-3837 R-3838

REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER FILTER ASSEMBLY A6		
C1	Cap, Alum., Elect., 3500 uf, +50%, -10%, 20 VDCW	C-4663
C2	Cap, Alum., Elect., 1000 uf, +50%, -10%, 20 VDCW	C-4655
C3	RF-401-2 only Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
C4	Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N4998	CR-0666
CR3	Diode, 1N4998	CR-0666
CR4	Diode, 1N4998	CR-0666
L1	Choke, Filter, 30 mh	L-0571



ANGES REQUIRED FOR BAND COVERAGE

MHZ	132-140	140-148	148-162	162-174
C5	18	18	12	12
C6	1.0	1.0	.82	.82
C7	18	18	12	12
C8	1.0	1.0	.82	.82
C9	27	27	18	18
C10	33	33	27	27
C15	27	22	18	15
C16	1.5	1.5	1.2	1.2
C17	22	20	15	12

FIGURE 4.18 - MULTIPLIER ASSEMBLY A7
SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER/FILTER ASSEMBLY A5		
C1	Cap, Alum, Elect, 100 uf, +50%, -10%, 75 VDCW	C-4668
CR1	RF-401-2 only Diode, 1N2071	CR-0001
CR2	RF-401-2 only Diode, 1N2071	CR-0001
CR3	RF-401-2 only Diode, 1N2071	CR-0001
CR4	RF-401-2 only Diode, 1N2071	CR-0001
CR5	Diode, 1N2071	CR-0001
CR6	Diode, 1N2071	CR-0001
CR7	Diode, 1N2071	CR-0001
CR8	Diode, 1N2071	CR-0001
CR9	Diode, 1N2071	CR-0001
R1	RF-401-2 only Res, W.W., 15 ohm, 10%, 5W	R-3808
R2	Res, W.W., 15 ohm, 10%, 5W	R-3808
R3	RF-401-2 only Res, comp, 120K, 10%, 2W	R-0349
R4	Res, comp, 120K, 10%, 2W	R-0349
R5	Res, comp, 3.3K, 10%, 2W	R-0330
R6	Res, comp, 10 ohm, 5%, 2W	R-1801
R7	RF-401-2 Res, W.W., 4.0K, 10%, 5W RF-404-3 Res, W.W., 4.5K, 10%, 5W	R-3837 R-3838

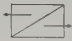
REF DESIG	DESCRIPTION	RF PART NUMBER
RECTIFIER FILTER ASSEMBLY A6		
C1	Cap, Alum., Elect., 3500 uf, +50%, -10%, 20 VDCW	C-4663
C2	Cap, Alum., Elect., 1000 uf, +50%, -10%, 20 VDCW	C-4655
C3	RF-401-2 only Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
C4	Cap, Alum., Elect., 70 uf, +50%, -10%, 450 VDCW	C-4687
CR1	Diode, 1N4998	CR-0666
CR2	Diode, 1N4998	CR-0666
CR3	Diode, 1N4998	CR-0666
CR4	Diode, 1N4998	CR-0666
L1	Choke, Filter, 30 mh	L-0571

MULTIPLIER ASSEMBLY A7, VOLTAGE RESISTANCE CHART

Stage	Voltage DC			Resistance		
	Base	Emitter	Collector	Base	Emitter	Collector
[illegible]		[illegible]	-1.	1Ω (1) 1Ω (1)	110Ω (2) 17Ω (1)	110Ω (2) 17Ω (1)
2		[illegible]	-10	4Ω (1) 4Ω (1)	110Ω (2) 18Ω (1)	100Ω (2) 16Ω (1)

NOTES

1. Resistance

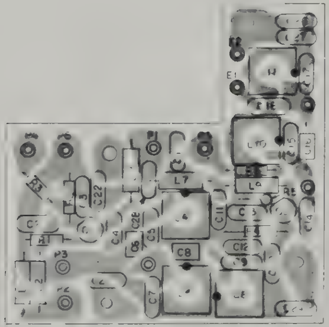


(1) R x 1 range
(2) R x 100 range
(3) R x 10,000 range

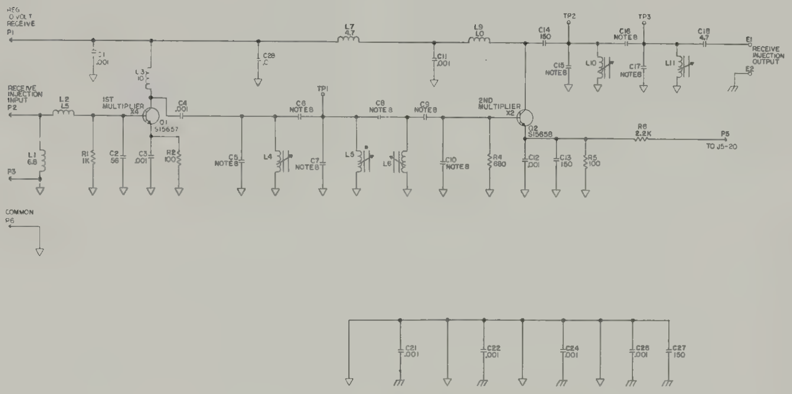
2. Measurements made with Simpson Model 260 VOM under no signal condition.

3. Measurements shown are actual readings and may vary by 15%.

4. Resistance measurements made with board disconnected.



MULTIPLIER ASSEMBLY A7, COMPONENT LOCATION



NOTES

1 ALL RESISTORS IN OHMS, 10%, 1/4WATT, UNLESS OTHERWISE SPECIFIED.
2 ALL CAPACITORS IN PICO FARADS UNLESS OTHERWISE SPECIFIED.
3 ALL INDUCTORS IN µH UNLESS OTHERWISE SPECIFIED.
4 ⏚ DENOTES CHASSIS GROUND.
5 ▽ DENOTES COMMON LINE.
6 ALL DC VOLTAGES REFERRED TO "COMMON" LINE.
7 ALL AC VOLTAGES REFERRED TO CHASSIS GROUND.

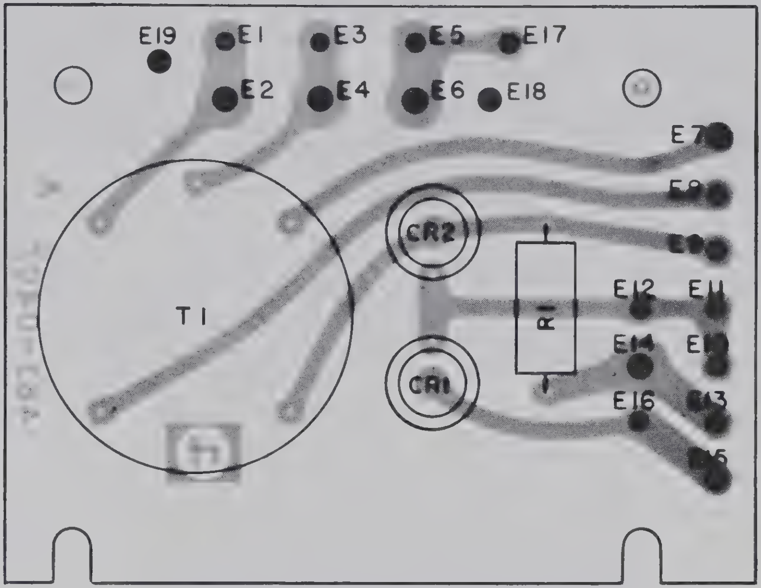
8 CHANGES REQUIRED FOR BAND COVERAGE

MHZ	132-140	140-148	148 162	162-174
C5	18	18	12	12
C6	10	10	.82	.82
C7	18	18	12	12
8	10	10	.82	.82
C9	27	27	18	18
10	33	33	27	27
C15	22	22	18	15
C16	1.5	1.5	1.2	1.2
C17	22	20	15	12

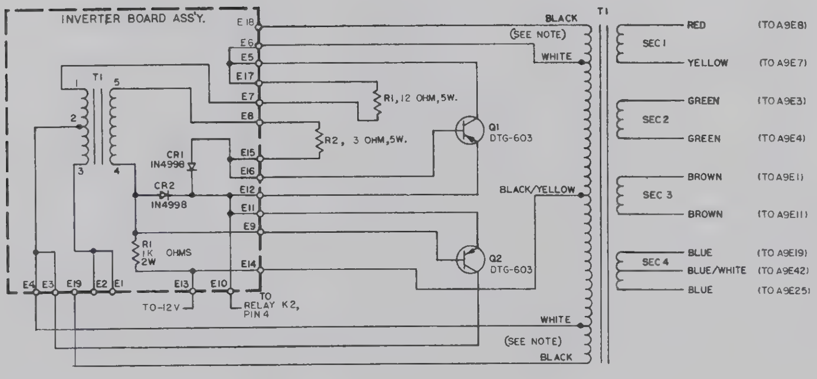
FIGURE 4.18 - MULTIPLIER ASSEMBLY A7 SCHEMATIC DIAGRAM

SCRIPTION	RF PART NUMBER
Cer, pf, 20%, VDCW	C-4794
Cer, pf, 20%, VDCW 0 MHz	C-4794
Cer,), 27 pf, 5%, VDCW 8 MHz	C-4748
Cer,), 22 pf, 5%, VDCW 2 MHz	C-4746
er,), 18 pf, 5%, VDCW 4 MHz	C-4744
er,), 15 pf, 5%, VDCW 8 MHz	C-4743
er, pf, 5%, VDCW 4 MHz	C-4612
er, pf, 5%, VDCW 0 MHz	C-4610
er,), 22 pf, 5%, VDCW 8 MHz	C-4746
er,), 20 pf, 5%, VDCW 2 MHz	C-4745
er,), 15 pf, 5%, VDCW 4 MHz	C-4743
er,), 12 pf, 5%, VDCW	C-4742
er, pf, 5%, VDCW	C-4624
ed	
isc, 1 uf, GMV, VDCW	C-0001
ed	
isc, 1 uf, GMV, VDCW	C-0001
ed	
isc, 1 uf, GMV, VDCW	C-0001
ed	
isc, 1 uf, GMV, VDCW	C-0001

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
	MULTIPLIER ASSEMBLY A7				
C27	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794			
C28	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065			
L1	Choke, 6.8 uh	L-0081			
L2	Choke, 1.5 uh	L-0076			
L3	Choke, 10 uh	L-0057			
L4	Inductor Assembly, Var	483-0228			
L5	Inductor Assembly, Var	483-0228			
L6	Inductor Assembly, Var	483-0228			
L7	Choke, 4.7 uh	L-0056			
L8	Not used				
L9	Choke, 1.0 uh	L-0054			
L10	Inductor Assembly, Var	483-0229			
L11	Inductor ASsembly, Var	483-0229			
Q1	Transistor, S15657	Q-0354			
Q2	Transistor, S15658	Q-0355			
R1	Res, comp, 1K, 10%, 1/4W	R-0024			
R2	Res, comp, 100 ohm, 10%, 1/4W	R-0012			
R3	Not used				
R4	Res, comp, 680 ohm, 10%, 1/4W	R-0022			
R5	Res, comp, 100 ohm, 10%, 1/4W	R-0012			
R6	Res, comp, 2.2K, 10%, 1/4W	R-0028			



DC/AC INVERTER BOARD ASSEMBLY
A8A1 COMPONENT LOCATION

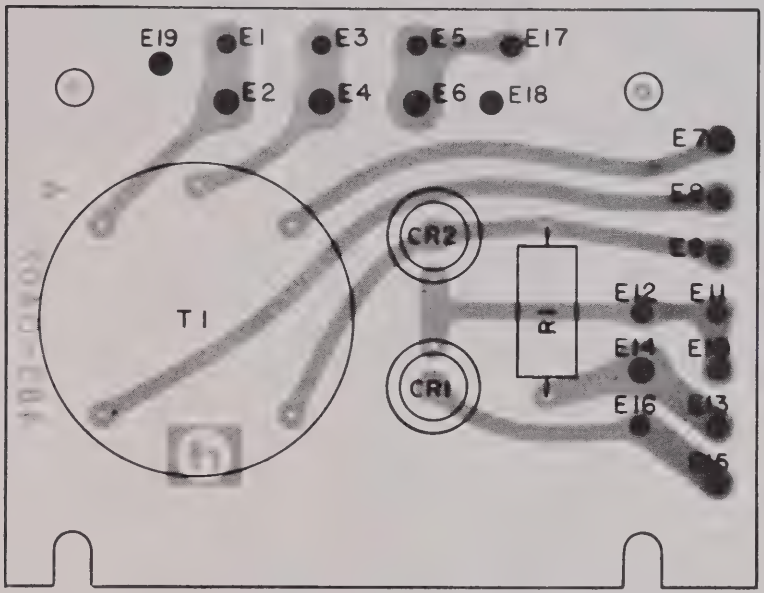


NOTE: WIRING SHOWN FOR T1 IS FOR NORMAL (13.6VDC NOMINAL) VOLTAGE. FOR OPERATION ABOVE 15.0 VDC CONNECT BLACK WIRES OF T1 TO E4 & E6 OF THE CONVERTER BOARD ASSY. AND THE WHITE WIRES OF T1 TO E19 & E18.

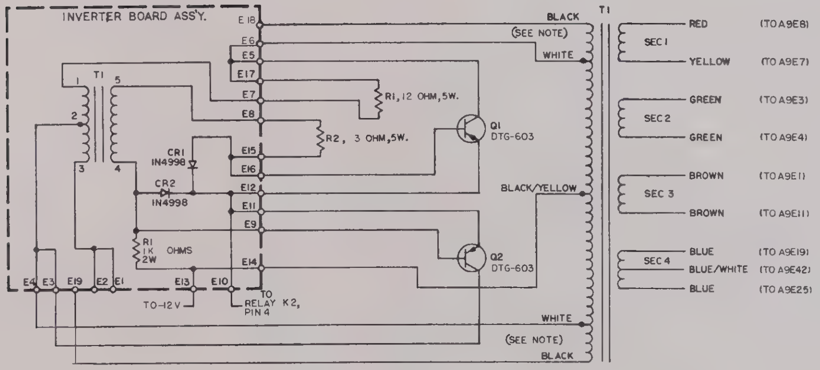
FIGURE 4. 19 - 13. 6 VOLT DC/AC INVERTER
ASSEMBLY A8 SCHEMATIC DIAGRAM

MULTIPLIER ASSEMBLY A7

REF DESIG	DESCRIPTION	RF PART NUMBER
C1	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C2	Cap, Cer, 56 pf, 20%, 1 KVDCW	C-4786
C3	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C4	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C5	132-148 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	148-174 MHz Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C6	132-148 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4608
	148-174 MHz Cap, Cer, 0.82 pf, 5%, 500 VDCW	C-4606
C7	132-148 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	148-174 MHz Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C8	132-148 MHz Cap, Cer, 1.0 pf, 5%, 500 VDCW	C-4608
	148-174 MHz Cap, Cer, 0.82 pf, 5%, 500 VDCW	C-4606
C9	132-148 MHz Cap, Cer, NPO, 27 pf, 5%, 1 KVDCW	C-4748
	148-174 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
C10	132-148 MHz Cap, Cer, NPO, 33 pf, 5%, 1 KVDCW	C-4750
	148-174 MHz Cap, Cer, NPO, 27 pf, 5%, 1 KVDCW	C-4748
C11	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C12	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C13	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C14	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C15	132-140 MHz Cap, Cer, NPO, 27 pf, 5%, 1 KVDCW	C-4748
	140-148 MHz Cap, Cer, NPO, 22 pf, 5%, 1 KVDCW	C-4746
	148-162 MHz Cap, Cer, NPO, 18 pf, 5%, 1 KVDCW	C-4744
	162-174 MHz Cap, Cer, NPO, 15 pf, 5%, 1 KVDCW	C-4743
C16	132-148 MHz Cap, Cer, 1.5 pf, 5%, 500 VDCW	C-4612
	148-174 MHz Cap, Cer, 1.2 pf, 5%, 500 VDCW	C-4610
C17	132-140 MHz Cap, Cer, NPO, 22 pf, 5%, 1 KVDCW	C-4746
	140-148 MHz Cap, Cer, NPO, 20 pf, 5%, 1 KVDCW	C-4745
	148-162 MHz Cap, Cer, NPO, 15 pf, 5%, 1 KVDCW	C-4743
	162-174 MHz Cap, Cer, NPO, 12 pf, 5%, 1 KVDCW	C-4742
C18	Cap, Cer, 4.7 pf, 5%, 1 KVDCW	C-4624
C19	Not used	
C20	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C21	Not used	
C22	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C23	Not used	
C24	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C25	Not used	
C26	Cap, Disc, 0.001 uf, GMV, 500 VDCW	C-0001
C27	Cap, Cer, 150 pf, 20%, 1 KVDCW	C-4794
C28	Cap, Cer, 0.01 uf, +60%, -40%, 150 VDCW	C-0065
L1	Choke, 6.8 uh	L-0081
L2	Choke, 1.5 uh	L-0076
L3	Choke, 10 uh	L-0057
L4	Inductor Assembly, Var	483-0228
L5	Inductor Assembly, Var	483-0228
L6	Inductor Assembly, Var	483-0228
L7	Choke, 4.7 uh	L-0056
L8	Not used	
L9	Choke, 1.0 uh	L-0054
L10	Inductor Assembly, Var	483-0229
L11	Inductor ASsembly, Var	483-0229
Q1	Transistor, S15657	Q-0354
Q2	Transistor, S15658	Q-0355
R1	Res, comp, 1K, 10%, 1/4W	R-0024
R2	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R3	Not used	
R4	Res, comp, 680 ohm, 10%, 1/4W	R-0022
R5	Res, comp, 100 ohm, 10%, 1/4W	R-0012
R6	Res, comp, 2.2K, 10%, 1/4W	R-0028



DC/AC INVERTER BOARD ASSEMBLY
A8A1 COMPONENT LOCATION

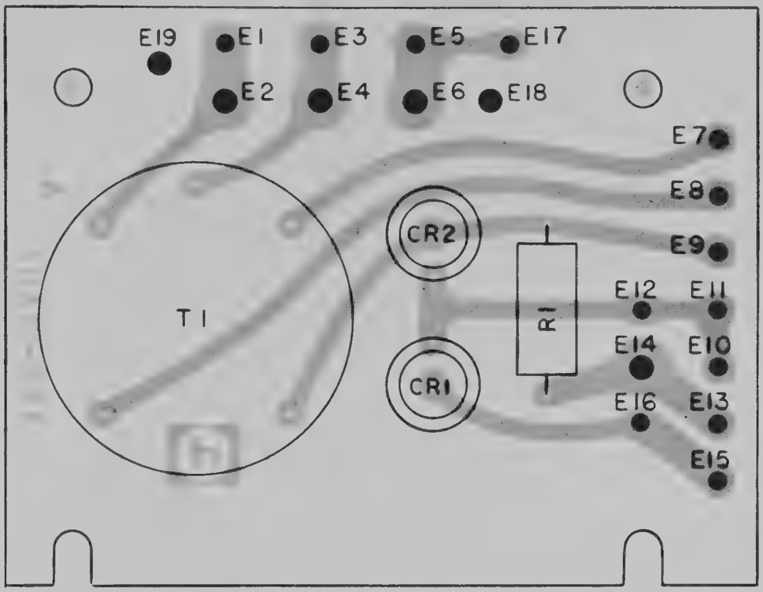


NOTE: WIRING SHOWN FOR T1 IS FOR NORMAL (13.6VDC NOMINAL) VOLTAGE. FOR OPERATION ABOVE 15.0 VDC CONNECT BLACK WIRES OF T1 TO E4 & E6 OF THE CONVERTER BOARD ASS'Y. AND THE WHITE WIRES OF T1 TO E19 & E18.

FIGURE 4. 19 - 13. 6 VOLT DC/AC INVERTER
ASSEMBLY A8 SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
13.6 VOLT DC/AC INVERTER A8		
A1	DC/AC Inverter Board Assembly, see separate parts list	484-0405
Q1	Transistor, DTG-603	Q-0350
Q2	Transistor, DTG-603	Q-0350
R1	Res, comp, 12 0hm, 5%, 5W	R-3994
R2	Res, comp, 3 ohm, 5%, 5W	R-3995
T1	Transformer, power	T-0192

REF DESIG	DESCRIPTION	RF PART NUMBER
DC/AC INVERTER BOARD ASSEMBLY A8A1		
CR1	Diode, 3AF1	CR-0079
CR2	Diode, 3AF1	CR-0079
R1	Res, comp, 1K, 10%, 2W	R-0324
T1	Transformer, feedback	T-0043



DC/AC INVERTER BOARD ASSEMBLY
A8A1 COMPONENT LOCATION

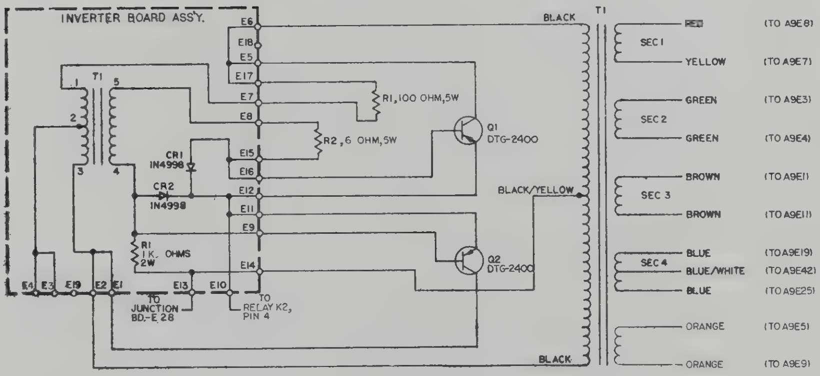
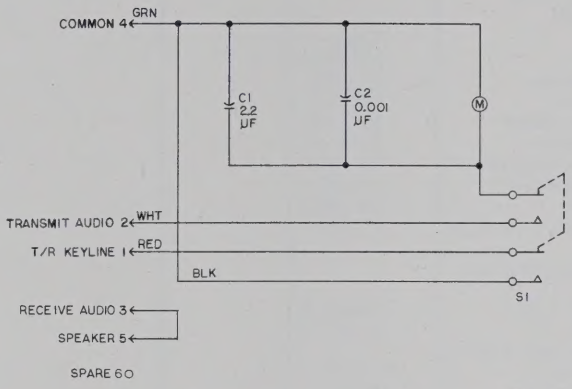


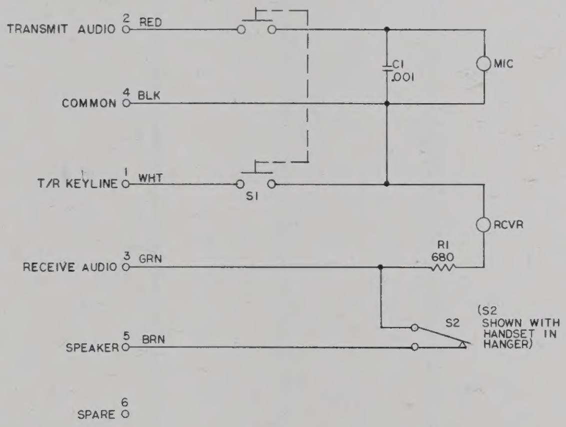
FIGURE 4.20 - 27.5 VOLT DC/AC INVERTER
ASSEMBLY A8 SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER
27.5 VOLT DC/AC INVERTER A8		
A1	DC/AC Inverter Board Assembly, see separate parts list	483-0405
Q1	Transistor, DTG-2400	Q-0367
Q2	Transistor, DTG-2400	Q-0367
R1	Res, comp, 100 ohm, 5%, 5W	R-3990
R2	Res, comp, 6 ohm, 5%, 5W	R-3988
T1	Transformer, power	T-0236

REF DESIG	DESCRIPTION	RF PART NUMBER
DC/AC INVERTER BOARD ASSEMBLY A8A1		
CR1	Diode, 3AF1	CR-0079
CR2	Diode, 3AF1	CR-0079
R1	Res, comp, 1K, 10%, 2W	R-0324
T1	Transformer, feedback	T-0233



(A) MICROPHONE



(B) HANDSET/HANGER

FIGURE 4.21 - HANDSET/HANGER AND MICROPHONE SCHEMATIC DIAGRAM

REF DESIG	DESCRIPTION	RF PART NUMBER	REF DESIG	DESCRIPTION	RF PART NUMBER
HANDSET/HANGER ASSEMBLY					
	Handset Assembly	483-0591			
C1	Cap, Cer, 0.001 uf, GMV, 500 VDCW	C-0001			
S1	Switch	S-0276			
	Handle	MP-3974			
	Transmitter Cap	MP-3975			
	Receiver Cap	MP-3976			
	Transmitter Button	MP-3952			
	Receiver Button	MP-3955			
	Transmitter Cup Assembly	MP-3977			
	Insert, Fiberboard	MP-3978			
	Strain Relief	MP-3990			
	Cord, Coiled, 4-conductor	W-1799			
	Hanger/Cable Assembly				
P1	Plug, Male, 6 pin	P-0530/36			
R1	Res, comp, 680 ohm, 10%, 1/4W	R-0022			
S1	Switch assembly	S-0277			
TB1	Terminal Board	TB-0186			
	Cradle	484-0589			
	Cable, 5-conductor	W-0958			

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